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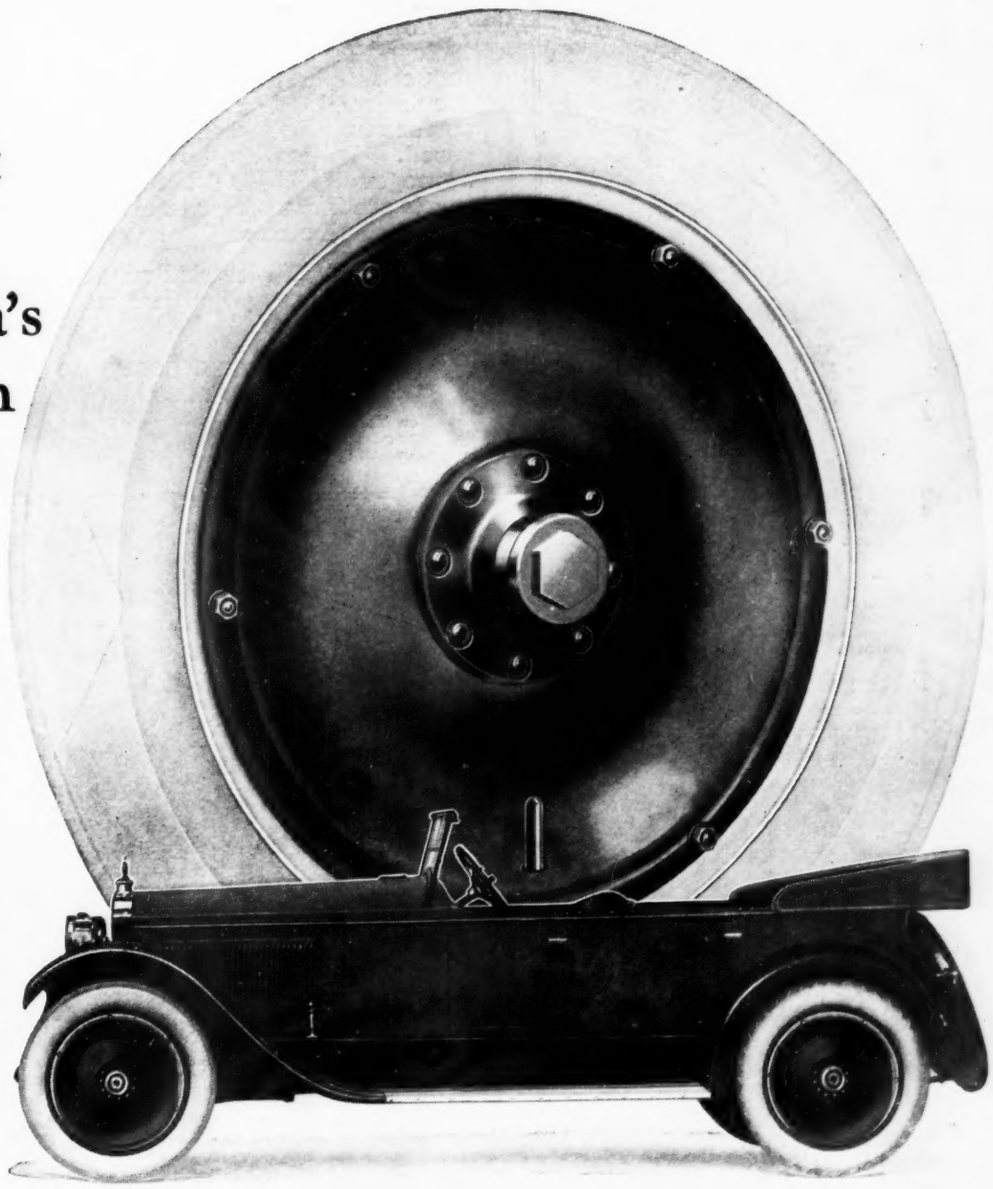

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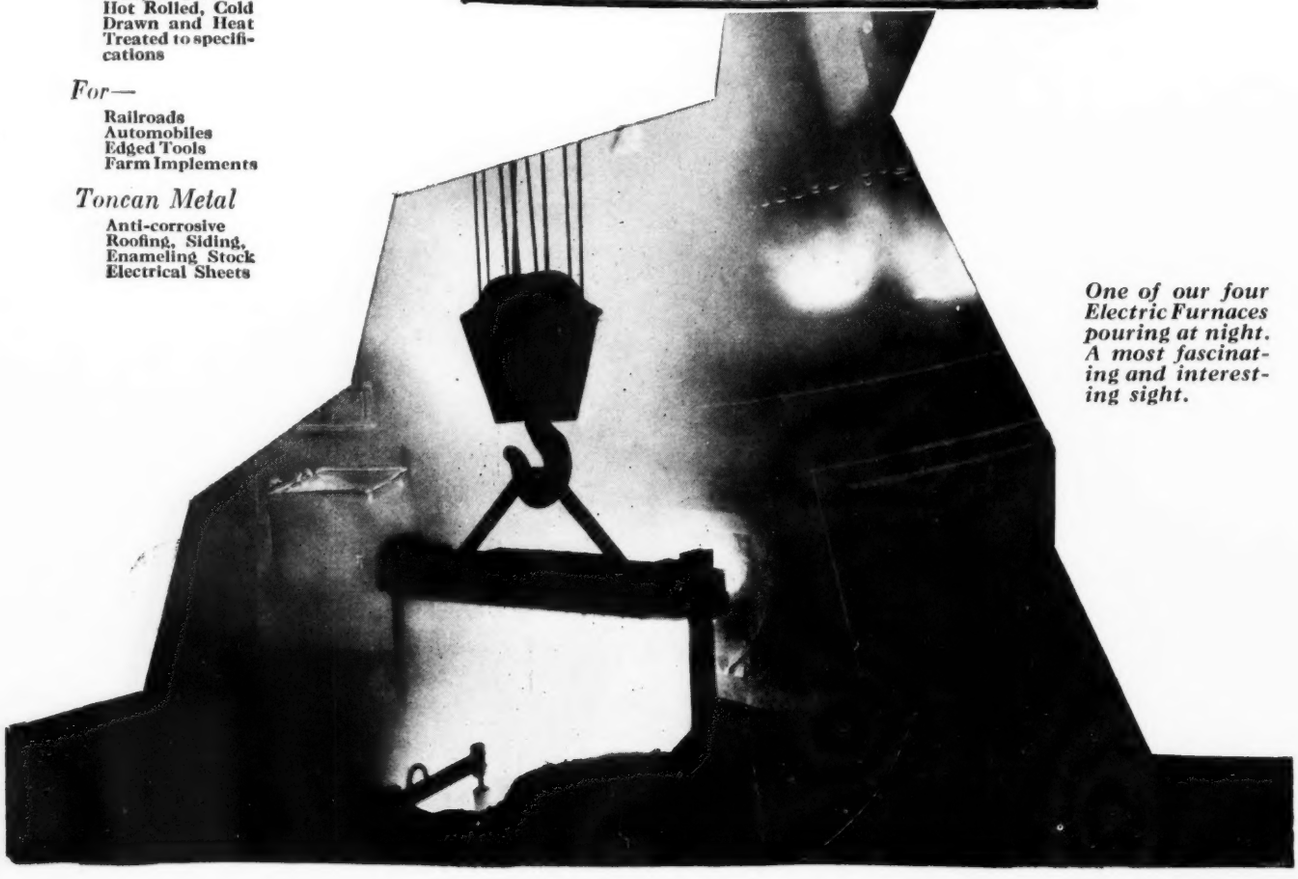

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLVIII NEW YORK—THURSDAY, JULY 13, 1922 No. 2

$90,000,000 Business in High Priced Cars During 1922

Makers selling cars priced at $3,000 or more. Two per cent of total production since 1912 consists of cars in this price group. 1922 production likely to be about 40 to 50 per cent of capacity.

By Norman G. Shidle
Charts and Statistics by Raymond B. Prescott

TWO-THIRDS of a billion dollars have been spent during the last ten years for cars priced at more than $3,000. In 1922 something like $90,000,000 will probably be spent for cars in this price class.

These figures are particularly interesting in view of the prominent part played recently in the financial news of the industry by companies making high-priced cars. Ford's acquisition of the Lincoln properties, the contradicted rumor of a Lafayette - Pierce - Arrow merger, and other news stories centering around high-grade car firms, make timely a look into the production and sales facts about cars in the "$3,000 and over" group.

Last year 31,619 cars were manufactured and sold in this price group, while a few less will probably be made during 1922. Last year the cars produced in this price class constituted about 2.3 per cent of the total car production. This year they will constitute probably about 1.5 per cent of the total number of cars produced.

There are seventeen companies comprising 20 per cent of the N. A. C. C. membership producing cars which sell for $3,000 or over. According to the figures just quoted, these companies divide between them about 2 per cent of the total car production and about 7 per cent of the total money received from automobile sales.

Five of the companies in this group are doing 97 per cent of the price-group business on a production basis and about 83 per cent of the business on a value basis.

Production capacity is always a difficult figure to estimate, but it may be said that the seventeen manufacturers in this price class are capable of producing at present something

HERE is No. 5. In a few weeks the final price class article will be printed. This No. 6 story will give the facts and figures about the "Under $1,000" price group. The complete series is as follows:

No. 1—*"The Industry As a Whole"—Nov.* 17, 1921.
No. 2—*"94 per cent of Sales Will Be of Cars Selling Under* $2,000"—*Dec.* 22, 1921.
No. 3—*"Keen Sales Competition in Middle Priced* ($1,000-$2,000) *Field"—March* 23, 1922.
No. 4—"$2,000-$3,000 *Car Production Probably Less in* 1922"—*May* 11, 1922.
No. 5—"$90,000,000 *Business in High Priced Cars During* 1922"—*July* 13, 1922.
No. 6—*"Under* $1,000"—*to come.*

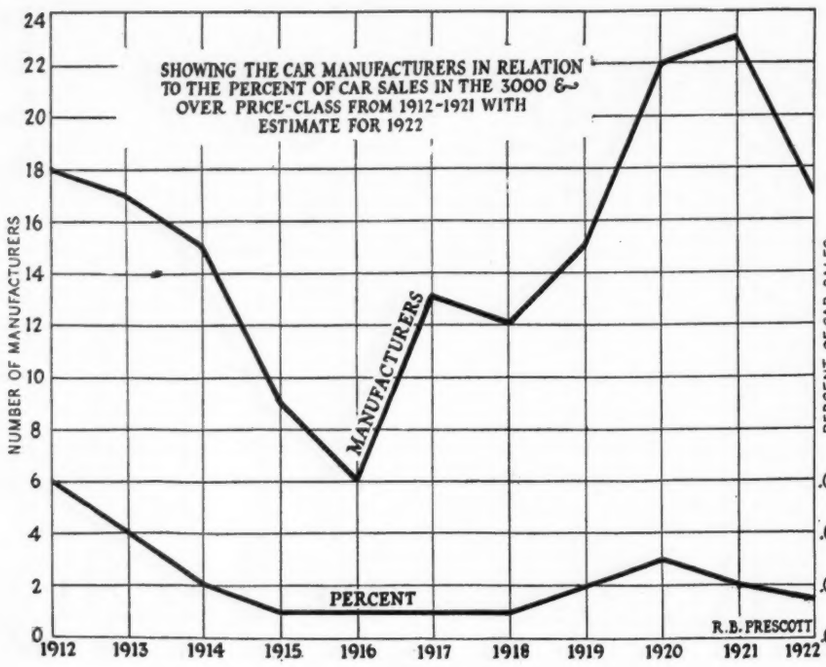

SHOWING THE CAR MANUFACTURERS IN RELATION TO THE PERCENT OF CAR SALES IN THE 3000 & OVER PRICE-CLASS FROM 1912-1921 WITH ESTIMATE FOR 1922
NUMBER OF MANUFACTURERS
PERCENT OF CAR SALES
MANUFACTURERS
PERCENT
R.B. PRESCOTT
0 2 4 6 8 10 12 14 16 18 20 22 24
.00 .02 .04 .06
1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922

Fig. 1

like 75,000 cars a year, which is about 45,000 more than they are likely to reach in 1922.

These are the essential facts about the sales record and production probabilities of cars in the "$3,000 and over" price class. What do they mean?

Like most answers to industrial questions of this kind, the interpretation must be relative in character. General conclusions can be drawn for the price group as a whole, which do not apply in any respect to certain individual companies within the group. Individuality in design, personnel, sales methods, and production organization are more prominent in determining trends in this price group than in any other. In buying cars for over $3,000, price itself plays a less important part than in the lower price classes.

Production Below Capacity

This price group is capable of producing many more cars than there is any likelihood it can sell in the near future. Its probable production in 1922 is about 40 per cent of its potential producing capacity. This one general conclusion can be readily drawn for the group as a whole.

But this very conclusion gives an excellent example of a case in which the general result does not apply at all to specific cases. One maker in this group, for example, made and sold over 600 cars during the month of May. In certain other cases, a far smaller numerical production has yielded makers in this group excellent profits.

Capacity production is by no means a prerequisite of substantial profits. Yet, under present conditions, analysis does not indicate that there is immediate potential business to yield acceptable profits to all of the manufacturers now operating in this price class.

The chart shown in Fig. 1, for instance, shows the relation between the number of manufacturers making cars in this price class and the percentage of total car production accounted for by vehicles costing more than $3,000.

Here it appears that from 1914 to 1922 there has been little change in the percentage of "over $3,000" cars, despite the fact that the number of firms manufacturing cars in this class has fluctuated all the way from 6 to 23. The market for cars of this price is fairly stable as related to total car production. This percentage is not materially affected by the actual number of makers trying to sell cars of this price.

Production of cars selling for more than $3,000 has not varied in direct proportion to the industry as a whole. Its digressions from the average are greater than is the case with the $2,000-$3,000 group. Fig. 2 shows the actual production of cars selling for $3,000 and over as compared with the actual and normal production of the industry as a whole.

In 1915, when the industry was continuing its upward production climb, this price class took a decided dip, and the 1918 drop was relatively greater than that of the whole industry. The war acceleration gave a great impetus to sales in this price class, and for the first time it progressed more rapidly than the industry average, reaching a high point in 1920. Its subsequent drop, however, indicates a return to pre-war conditions, with the 1922 prediction indicating a recurrence of the 1915 situation, when the whole industry went forward but this high price class dropped slightly.

The individual manufacturer is chiefly concerned with the relation of his business to the total sales of the group in which he is operating. The chart shown in Fig. 3 shows the production progress of seven important companies in this price group from 1912 to 1921 inclusive. Similar curves can be applied by any maker for his own product.

Comparison with Lower Price Classes

A closer study of these relationships is not quite so interesting as in the case of the cars in lower price classes. The wide price range of "$3,000 and over" leaves considerable room for price fluctuation within the group serious enough to affect sales. Yet since the factor of price plays a comparatively small part in affect-

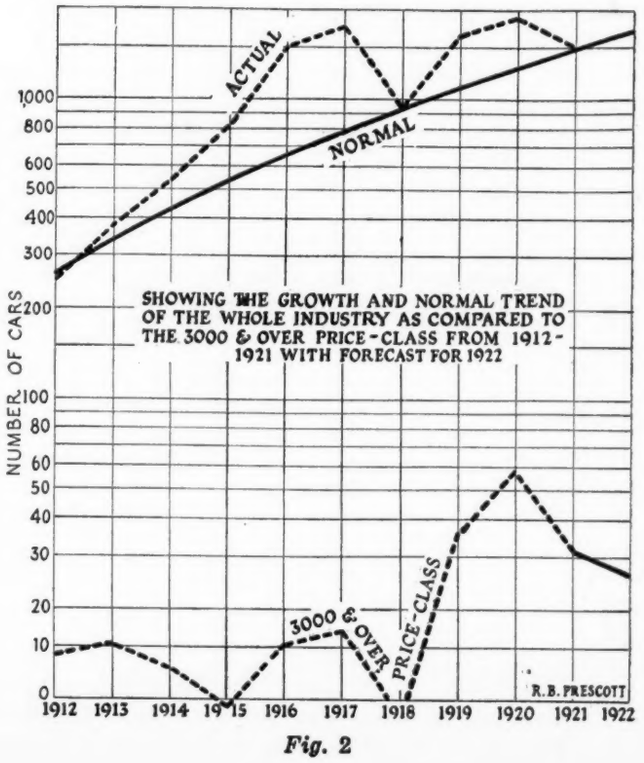

ACTUAL
NORMAL
SHOWING THE GROWTH AND NORMAL TREND OF THE WHOLE INDUSTRY AS COMPARED TO THE 3000 & OVER PRICE-CLASS FROM 1912-1921 WITH FORECAST FOR 1922
NUMBER OF CARS
3000 & OVER PRICE-CLASS
R.B. PRESCOTT
0 10 20 30 40 50 60 80 100 200 300 400 500 600 800 1000
1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922

Fig. 2

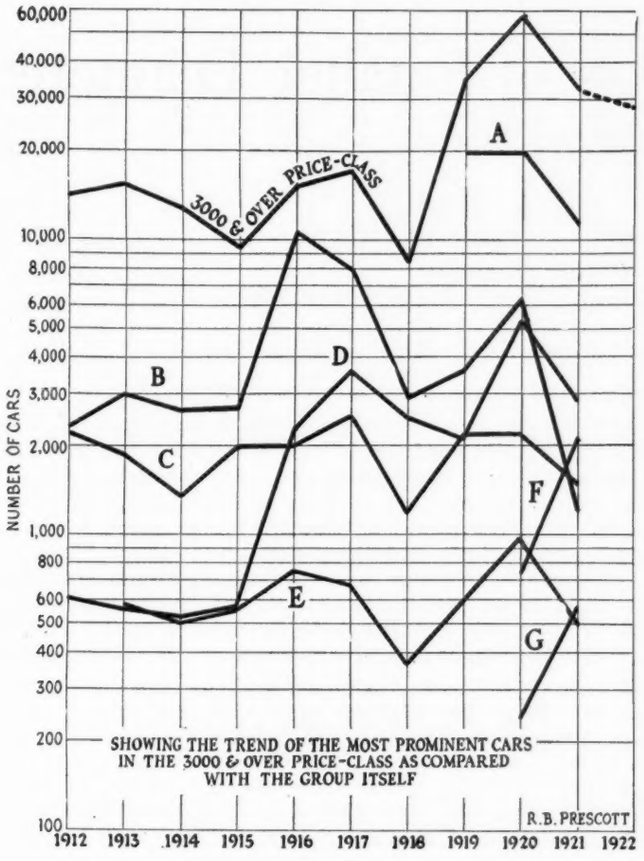


Fig. 3

ing buying desire in this price group, the relationships still hold to a large extent.

In some cases the period during which the car has been built or during which it has sold for more than $3,000 is so short as to make detailed analysis difficult. This is true of companies A, F, and G. The drop of "A" in 1921 was due chiefly to a material price increase which has since been changed.

How Various Companies Compare

It is interesting to make a more or less detailed study of the fluctuating production, not only of the price class as a whole, but of individual companies making cars within the price range in question. Fig. 3 presents particulars in this connection in graphical form. The total production of all makes of cars selling for $3,000 or over fluctuated from about 9,000 to about 16,000 for a period of six years from 1912 to 1918, the maximum production of any one company during that year being slightly over 10,000 cars, in 1916. After 1916 the war caused a falling off for two years and then came the boom of 1919 and 1920 when a total of nearly 60,000 high grade cars were sold. During these two years a newcomer in the high price field sold 40,000 cars or about three times as many as the nearest competitor in this field. During the same years, others less well prepared for the boom, or unable for some other reason to hold the pace failed to equal peak performances of earlier years. Except for 1919 and 1920, more cars sold for $3,000 or over in 1921 than in any earlier year, but this was due mainly to the large sales of newcomers.

"F" and "G" were new firms which made progress while others in their price class were falling, apparently because of novelty of design and appearance, bringing a fresh note into a generally dull selling season.

"B" has been in the field ever since 1912. Until 1915 it kept pace with the general movement of the price class, but in the following year went forward rapidly. From that time until 1920 it always did as well or better than the price group as a whole with the exception of 1919, when its gains were not quite so great in proportion. Analysis of this curve, however, indicates that this company had sound, satisfactory progress throughout the entire period, when viewed in relation to the price class as a whole.

The 1921 drop would seem unaccountable, except for the introduction of a new model in a lower price class upon which sales efforts were concentrated.

"C" has a production curve almost identical with that of the price group as a whole, excepting during the years 1912 and 1913. Thus its progress from a marketing standpoint can be considered sound up to 1921.

"D" started at a relatively low position, but assumed a more prominent place in 1915, which it has held ever since. This curve, also, indicates relatively satisfactory progress.

"E" has followed the movement of the price group rather consistently throughout its career.

For those desiring more detailed price group figures, Fig. 4 gives the production by years of cars selling between $3,000 and $4,000 and those selling for more than $4,000. The fact that these lines cross each other several times is not very significant, since the importance of price as a buying force is comparatively small, as has been pointed out previously.

It is characteristic of the companies which have been in this price group for many years that they have followed, in a general way, rather closely along the lines of the group progress.

Rapid Changes in Group Membership

There has been a higher percentage of comings and goings in and out of this group, however, than has been the case in any of the other price classes. Thirteen companies have gone out of business from this price class during the period 1913-1921 inclusive. During the

(*Continued at bottom of next page*)

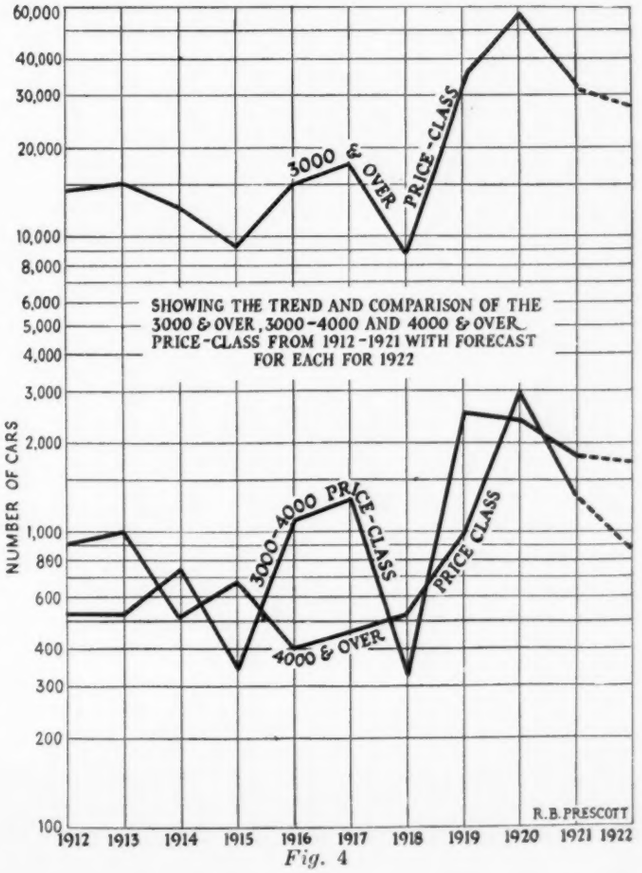


Fig. 4

Lighter Cars With Wheels of Smaller Diameter Predicted

More Aluminum to Be Employed—Smaller Wheels with Tires of Larger Section Give Better Riding Qualities

By J. Edward Schipper

JUDGING from the activity in practically all of the laboratories of the motor car manufacturers, it would not be surprising to find a marked increase in the use of aluminum in this year's cars. Aluminum timing gears which a great many of the manufacturers have been using successfully during the past year have shown that this material is durable in parts which are subject to continuous stress. The forged aluminum connecting-rods are already in the hands of many more users than is generally supposed. A number of concerns have put these rods out on test cars and kept an accurate record of their performance, in several cases, without the purchaser knowing that he had a car equipped with aluminum connecting-rods. The ability to rapidly machine this material is one of the factors which is helping to promote its greater use. It is said, for example, that forged aluminum can be manufactured almost on a wood-working schedule, as it is possible to increase the cutting speeds to such a great extent.

The cry for lightness has again become insistent, and if it is going to be possible by the use of forged and rolled aluminum to materially reduce car weight, this material is going to be heavily drawn upon in next year's design. As a matter of fact, one prominent consulting engineer at the present time is engaged on the design of a car which he states will not weigh over 1250 lb. without body. This is a six-cylinder unit designed to run at high speeds, 4000 r.p.m. being mentioned as probably the peak point.

It is a well-known fact that European car makers have been making rapid strides during the last two years toward lighter, high-speed engines. The tax on bore which is prevalent on the Continent is no doubt largely responsible for the acceleration in the design of small-bore, high-speed engines. While it is doubtful if this will ever be carried to the extreme in this country that it is in Europe, the lessons learned in the design of these high-speed engines are having some marked influences on American practice. The more rigid crankshafts and the crankcases, coupled with the increased use of high-pressure lubricating systems, indicates a tendency toward higher speed which is quite apparent in engineering circles.

A trend which fits in very well with the lighter and more economical vehicles is toward the use of smaller wheels. The 20-in. wheel with the new tire sizes which give a small exterior diameter but a very wide cross sectional diameter permit of carrying lower inflation pressures, thereby greatly promoting easy riding. A car designed in this way with the oversize tire inflated to perhaps 45 lb., will give a remarkably easy-riding vehicle. With the cord tire construction and improved practice in tire manufacture generally, the life of the tire is not seriously affected. In fact, it has been generally claimed that with a vehicle designed for lightness, these low inflation pressures would be fully up to the requirements of the tire manufacturer. Furthermore, the shock-absorbing capability of a pneumatic tire which is not too highly inflated are such as to greatly reduce the wear and tear on the vehicle and correspondingly increase its life.

Engineers regard the possibility of this type of construction as highly interesting and thoroughly sound from an engineering point of view. From the ultimate purchaser's standpoint, by which all cars must in the long run be judged, it would be difficult to find a vehicle which more nearly answers public demand. The higher speed engine in combination with a lower final gear ratio will enable rapid acceleration, while the lighter weight and larger relative size tires would give increased tire life, higher gasoline economy and materially improved riding characteristics.

$90,000,000 Business in High Priced Cars During 1922

(*Continued from page* 53)

same period eight companies went out of business in the $2,000-$3,000 price class, while the total number of companies in each case is about equal.

The record of incomings and outgoings in the "$3,000 and over" group is as follows:

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922
Total in group	18	17	15	9	6	13	12	15	22	23	17
New cars..... ..		22	0	0	1	1	1	0	6	0	1
From lower price group. ..		2	3	0	0	6	0	3	5	3	0
Out of business		2	3	2	1	0	2	0	3	0	0
To lower price group.... ..		3	2	4	3	0	0	0	1	2	7

The proportion of cars selling for high prices bears a rather steady relation to the total production and this percentage is somewhere in the neighborhood of 2 to 3 per cent. The number of makers trying to market high grade cars has not materially affected this percentage in the past. The 1922 prediction for proportion of production in this price class seems to be pretty well borne out by the production figures available up to the time this article was prepared.

Blended Fuel Meets with Limited Success in France

Government price-control of "national" blended fuel makes operating cost studies difficult. General Omnibus Co. finds cost per mile cheaper than with gasoline, but maintenance costs rise 25 per cent. Carbureter and heating changed for new fuel.

By W. F. Bradley

ALCOHOL as fuel for internal combustion engines is finding its biggest commercial application on the fleet of one thousand motor buses owned by the Paris General Omnibus Company. This concern, which has a monopoly of surface lines in the city of Paris, has been using a 50-50 alcohol-benzol mixture exclusively since Aug. 1, 1921, and during these eleven months the Paris buses have consumed 6,000,000 American gallons of the alcohol-benzol mixture somewhat misleadingly termed "national fuel."

This change from straight gasoline to a fuel having an alcohol basis has not been made without a certain amount of opposition and criticism from vested interests. The gasoline ring, notably, was annoyed at the loss of its biggest individual client in France using 7,000,000 gallons of fuel a year with a certainty of an increase. Truck owners and the various taxicab companies also felt that they were placed at a disadvantage by the Government arrangement which practically gave the Omnibus Company a monopoly of benzol supplies. Because of this feeling it was not always easy to discover exactly what results were being obtained from the use of the alcohol-benzol mixture: even among the engineers of the Omnibus Company both favorable and unfavorable comment could be heard.

It now has to be admitted that the Paris motor bus service is being run with the same degree of regularity on an alcohol-benzol mixture as with gasoline or benzol, or mixtures of these two fuels. The cost per mile, too, is cheaper than with straight gasoline. This result, however, is obtained only by means of a special arrangement with the French Government which is interested in encouraging the use of a home-produced fuel, and has arranged with the Omnibus Company to take up the whole of the alcohol-benzol supplies at very advantageous rates. The same mixture has been put on the market, but supplies are not always available, and even when the mixture can be secured it is more costly than straight gasoline. The policy of the French authorities appears to be to take advantage of the present favorable circumstances—cheap German benzol and war stocks of alcohol—to carry out a big, practical experiment in the use of what may later become a really national fuel.

THE use of blended fuels, especially those containing alcohol and benzol, is increasing in this country as well as in Europe and in South and Central America.

Consequently the experience of large users of these products, such as is given in this article, should be of considerable interest to American manufacturers whose product sooner or later will be used with similar blended fuels.

Fuels containing alcohol and gasoline withstand higher compression pressures than most gasolines, and the higher economy available with such fuels can be realized only when the compression is increased.

The corrosive action of commercial alcohol and benzol is largely due to acid content which can be removed by proper refining methods or largely neutralized by substances such as pyridine bases.

By the terms of the Versailles Treaty, Germany is under an obligation to deliver to France large quantities of benzol as compensation for the benzol-producing plants destroyed by her during the war. This benzol is turned over to the French Government. During the war alcohol had been produced at the rate of nearly 200,000 gallons a day for the purpose of manufacturing explosives. The Armistice found immense stocks on hand, and the most suitable way of disposing of these seemed to be to mix them with the German benzol and cause them to be used in internal combustion engines. Some attempt was made to induce the individual owner to use this alcohol-benzol mixture denominated "national fuel," but the effort was not followed up and there was not the organization necessary to compete with imported gasoline.

The price paid by the Paris Omnibus Company for its Government fuel is not known, but it is admitted by officials of the company that they get very special treatment from the Government and that if they had to go into the competitive market for their fuel they would not use alcohol-benzol. This is proved by the refusal of the taxicab companies and automobile truckers to use the Government mixture.

In the neighborhood of Paris the price paid for high grade gasoline is 1 fr. 70c. per litre, and since a litre contains 7700 calories, the cost per 1000 calories becomes 22 centimes. The alcohol-benzol mixture, containing 6700 calories per litre, is 1 fr. 65c. per litre, or 24.5 cen-

times per 1000 calories. On this basis straight gasoline is more advantageous than the alcohol-benzol mixture. Theoretically the consumption ratios are in the ratio 10 for straight gasoline, compared to 11.5 for alcohol-benzol. The engineers of the Omnibus Company declare that the fuel consumption of their fleet has increased 35 per cent in bulk since the present mixture was adopted. This figure is the average obtained during the experimental period when there were sudden fluctuations the reasons for which could not always be found. During the last two or three months the figures show a greater degree of regularity, which is proof that the initial difficulties are being overcome.

Fuel consumption now works out at the rate of 7 miles to the American gallon, this being the average for the 1000 omnibuses operating in all parts of the city and in a few of the suburbs. There is one general type of chassis and two types of engines, the older model being a four-cylinder of 125 by 140 mm. bore and stroke running at 900 revolutions, and the newer model being 105 by 150 mm. running at 1000 revolutions. The single deck bodies carry 38 passengers; the weight empty is 5 tons, and with full load with passengers averages 8 tons.

THESE engines were designed to run on gasoline and have a compression of 101 lb. for the old type and 100 lb. for the newer model. When it was decided, last August, to make an exclusive use of the alcohol-benzol mixture the advisability of increasing the compression was taken up. The present Government monopoly of alcohol is of a temporary nature and it is not certain that the alcohol-benzol mixture will be available for more than a couple of years. In view of the fact, therefore, that it may be necessary to go back to straight gasoline or some other fuel at a not very distant time, it was decided to leave the compression unchanged, although an increase would have given better economy.

All the changes that have been made for the use of the alcohol-benzol are in the carbureter and the method of heating. Both Zenith and Solex carbureters are used by the omnibus company, with their own type of intake manifold and heating by both hot gases from the exhaust and hot water. Much more heat than is required for gasoline is essential for success with the alcohol mixture.

Maintenance costs are declared to have increased 25 per cent since the alcohol-mixture was put into use. This is accounted for by labor charges, for the spare parts service shows than there has been no appreciably increased expenditure for spares during the last eleven months. With the present mixture of 95 deg. alcohol and benzol having a density of 0.880 there is no deterioration of pistons, valves, or valve seats. Cast iron and aluminum pistons are equally unaffected by this mixture.

IN its liquid condition this mixture is not free from corrosive action. In fact, the 25 per cent increase in maintenance charges appears to have arisen from the corrosive action of the fuel on tanks, piping, carbureter and accessories. Nickel is said to be the only metal which will stand up for the needle valve of the carbureter; aluminum has to be avoided, and extreme precautions have to be taken to prevent the rusting of such parts as the exhaust manifold, valve caps, push rods, carbureter and ignition control rods, in fact, every part under the hood not completely protected by paint.

Flexibility is the same with alcohol-benzol as with gasoline; there is no loss of power. In winter starting is a more difficult matter, but nothing has been done to overcome this other than greater physical effort. As the consumption records show, a sudden drop in the temperature is liable to cause an increase in the amount of fuel consumed, if immediate precautions are not made to overcome this by adequate heating arrangements. Precautions have to be taken to keep the alcohol free from water, but this is not a matter of great difficulty for a concern handling its fuel in large quantities in underground tanks.

The experience of the Paris Omnibus Company is that the technical difficulties in connection with the use of mixtures of alcohol and benzol in existing engines can easily be overcome. The real problem to be solved is the production of adequate supplies and the marketing of them at a price capable of competing with gasoline.

A Promising Cracking Process

BECAUSE of certain unauthorized and rather extravagant statements that have recently appeared in the press concerning the so-called Bowie-Gavin "cracking" process, the Bureau of Mines makes the following statement regarding the experimental work that has been done up to the present time.

The process is designed primarily for the cracking of tars, heavy crudes, residuals, etc. It is possible that it also may be applicable to the recovery of oils from oil-soaked sands, oil-shales, etc., but no attempt has been made to perfect it along these lines, as it is not felt that extractions of this nature could be made profitably under present commercial conditions.

The process consists briefly of cracking hydrocarbon materials that contain no gasoline or kerosene products, in a still of novel design, and producing a cracked oil yielding relatively large proportions of gasoline, kerosene, etc. It is designed to be continuous, and the recovery of cracked oil is often as much as 85 per cent by volume of the original oil used. The oil produced by the process contains a relatively high percentage of unsaturated products. Results to date have indicated that many of the carbon difficulties, always a bugbear in cracking heavy oils, have been overcome. An attempt is being made to convert the carbon into producer gas, which, together with the fixed gas yielded in every cracking process, will furnish a considerable portion of the fuel necessary for operating the plant.

Laboratory experiments have been carried on by the Bureau of Mines for a number of years, and within the past year an 8-foot commercial apparatus has been constructed and operated intermittently at San Francisco. No claims have ever been made that the process has reached a commercial success; on the contrary, it is still decidedly in the experimental stage. However, tests recently made indicate that, so far as the still is concerned, the remaining mechanical difficulties could possibly be overcome by continuous operation of the plant. As this will probably require a larger amount of money than the Bureau of Mines will be able to expend, it is doubtful whether the bureau will be able to carry the experiments to a satisfactory conclusion.

A bulletin covering the process and apparatus is being prepared.

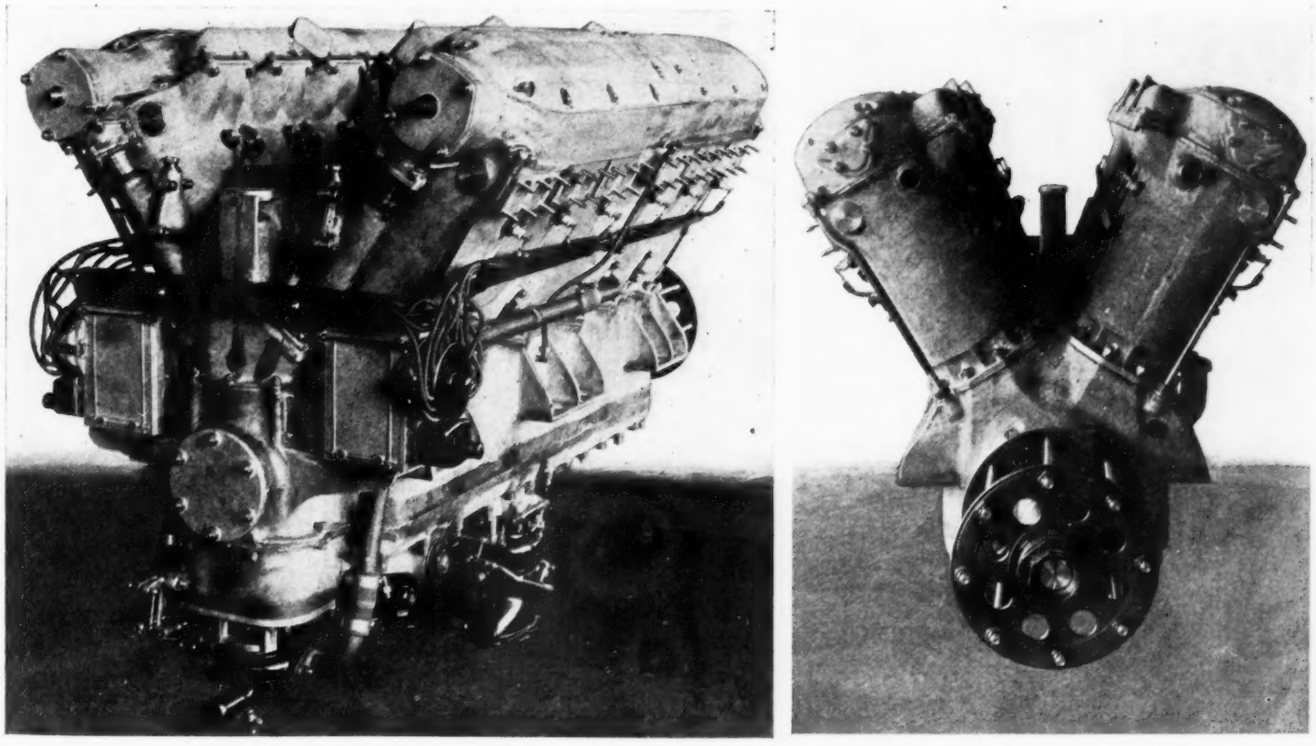
Wright-Navy Twelve Reflects Progress in Aircraft Engine Design

Dependability over long periods of operation is combined with low fuel consumption and unusual degree of accessibility. Engine develop 525 hp. but has same overall length as Liberty twelve. Open end sleeve used and babbitt bearings eliminated.

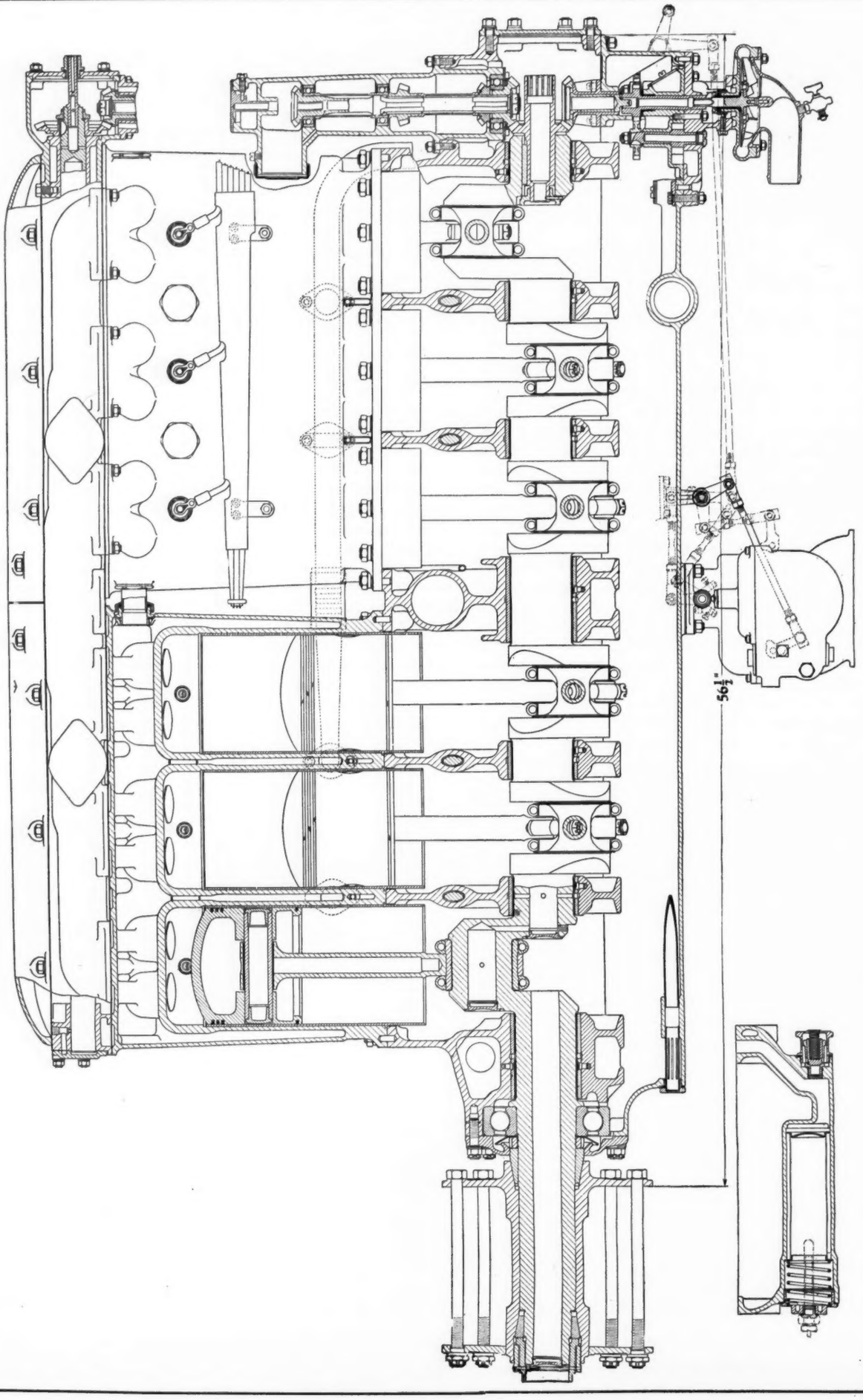
By Herbert Chase

RAPID advances in engine design are being made in the aeronautic field which should not escape the notice of all automotive engineers who are interested in following progress in the development of modern automotive engines. Although aeronautic practice cannot be followed in many respects in other automotive lines, there are many structural details of common interest which are deserving of close study. For this and other reasons considerable space is here given to drawings and description of the new Wright twelve-cylinder engine designed by the Wright Aeronautical Corp., primarily for use in Navy Department seaplanes. This engine, though intended especially for rather heavy duty service in seaplanes which must be capable of sustained flight of many hours duration, is not by any means limited to this class of service, and the type developed seems likely to see a wide field of application. It is owing to the Navy's forward looking policy of encouraging work of this character that it has been possible for the Wright engineers to produce an engine of such advanced design.

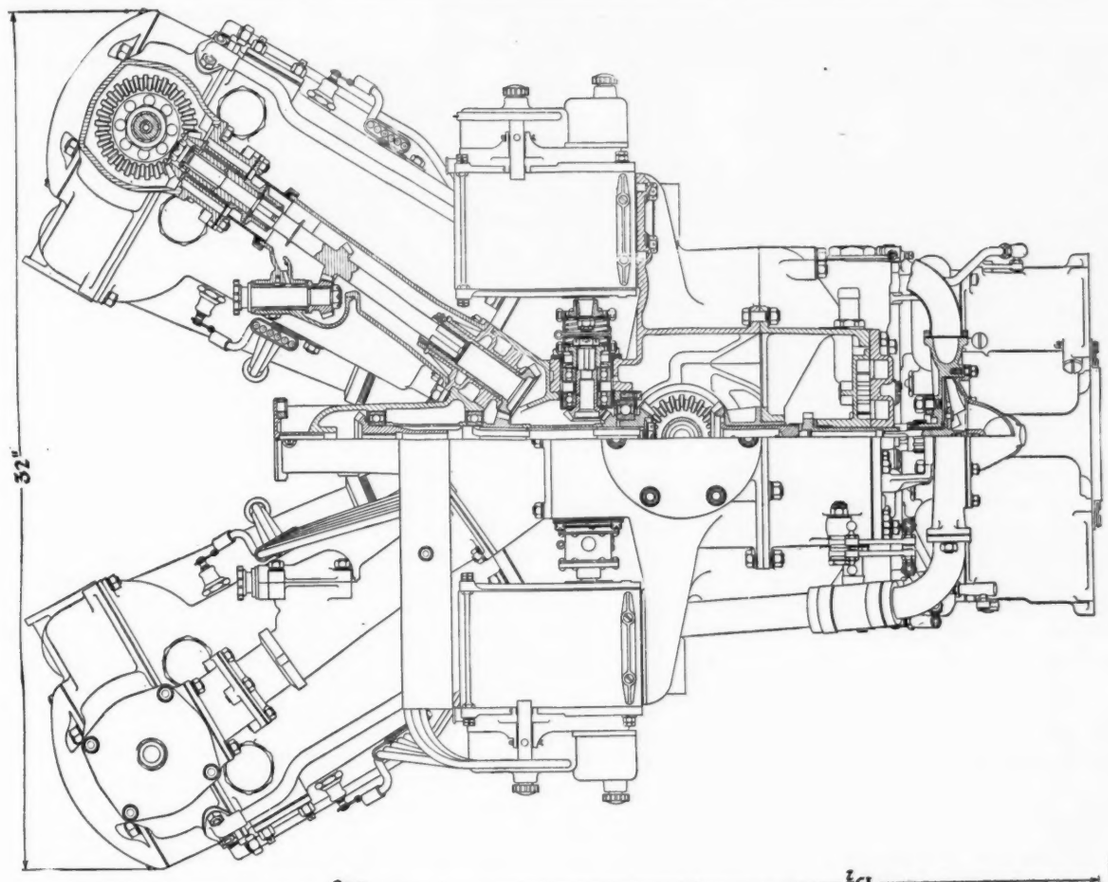
It will interest those who have not followed aeronautic engine development closely to note that there is a marked tendency toward the use of engines which are capable of carrying their rated load without distress over long periods, and that to assist in accomplishing this and also maintaining high fuel economy, compression ratios are being raised and the inlet passages then slightly throttled to restrict maximum output and hold it somewhat below the peak performance which can be maintained for shorter periods. Other points of interest relate to the successful

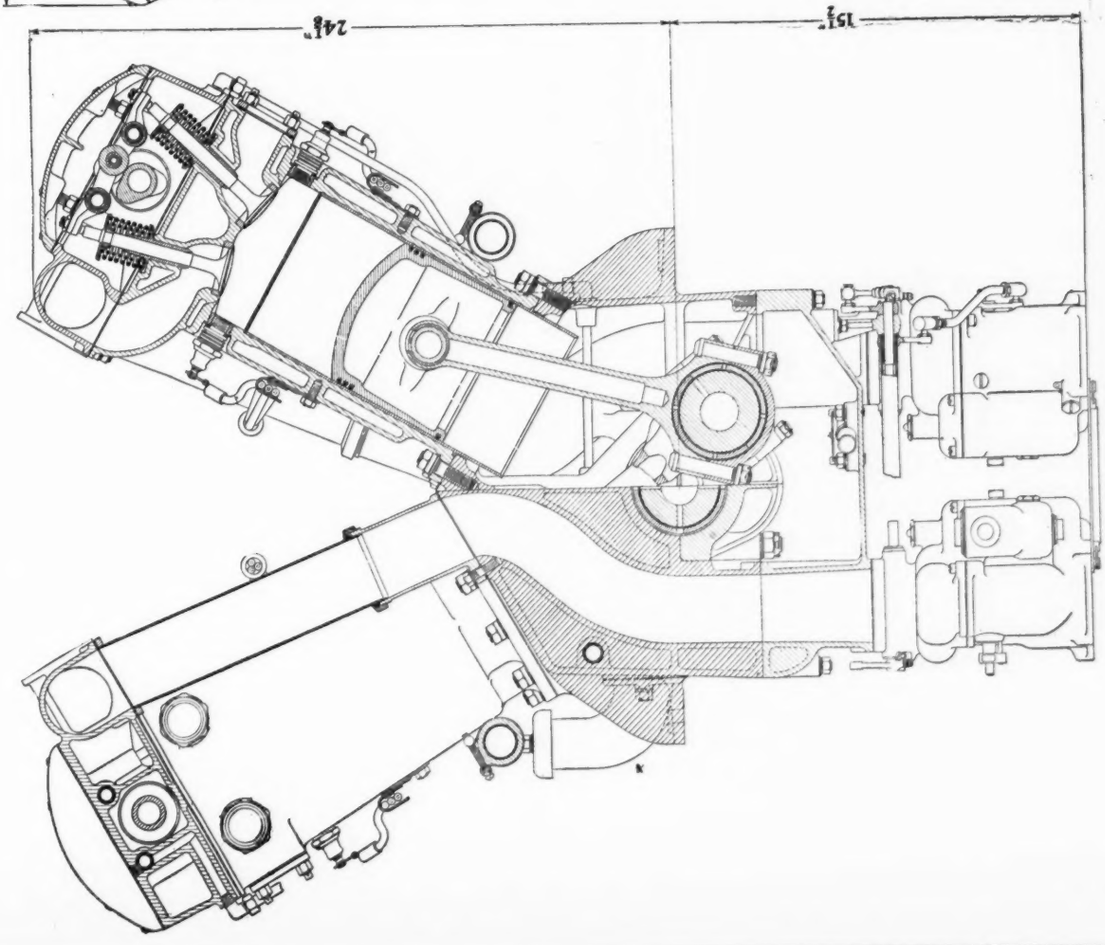


(Left) Three-quarter rear view of the new Wright model T-2, twelve-cylinder aircraft engine which develops over 500 hp. but is slightly shorter than the Liberty twelve and fits into the same bed timbers. (Right) Propeller end of the Wright engine, showing clean appearance and relatively small frontal area. The carbureters are below the crankcase, leaving the Vee clear

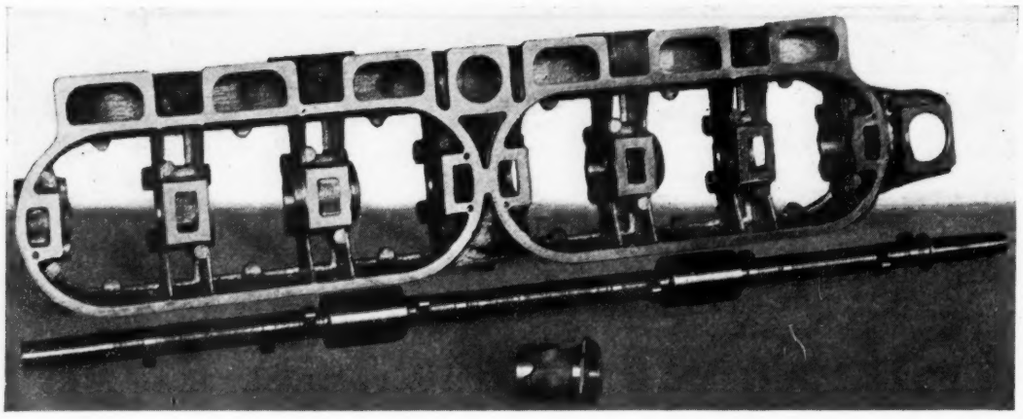


Lateral section of the new Wright engine. Note method of attaching bevel gear at rear end of crankshaft. The insert is a sectional view of the combined oil strainer and pressure relief valve unit carried in the lower half of crankcase





Transverse sectional views of the Wright model T-2 engine. Note cored passage to carbureters located below crankcase, and convenient layout of shafts for driving overhead camshaft and accessories, also aluminum cylinder with inserted steel sleeve and valve seats of aluminum bronze



Cam box and camshaft, showing also the integrally cast inlet manifold

use of aluminum cylinders with inserted valve seats and spark plug bushings of aluminum bronze; to the elimination of babbitt lined bearings, and the use of main bearing caps of forged aluminum; to the compact and convenient layout of the overhead camshaft and accessory drive; and to several features which make for greater accessibility, thorough lubrication and long life of wearing parts.

Some of the features which this engine embodies are quite new, at least in the combination employed, while some of them have been used in other Wright engines heretofore described in these columns. Among them may be mentioned integrally cast manifolds so arranged that the carbureters can be located either in the Vee or below the crankcase, elimination of all welded jacket joints, and the use of a construction which not only provides unusual accessibility, but which can be taken down without removing the engine from the plane and by breaking an unusually small number of joints. All this has been accomplished in an engine which develops about 100 hp. more than the Liberty twelve, but which is slightly shorter than the Liberty and fits into the same bed timbers. Furthermore, the engine was designed, built and successfully completed a 50-hour endurance test in less than a year's time—an exceptional if not a record performance.

Durability Increased by Throttling

The engine has 5¾ in. bore, and the stroke is 6¼ in., giving a total piston displacement of 1947 cu. in. The rated power is 525 at 1800 r.p.m., this corresponding to 118.5 lb. brake m.e.p. The engine is purposely somewhat throttled in order to increase its durability and dependability. The compression ratio is 5½ to 1 and the weight 1100 lb. The Vee angle is 60 degrees. The cylinders are cast in aluminum in four blocks of three, with integral jacket walls and heads.

The open end steel sleeve employed acts only as a bearing surface for the piston and is not required to take strain in tension as in some of the eight-cylinder engines built by the Wright company. This makes it possible to seat the valves directly in bushings which are inserted after the cylinder has been raised to a high temperature in an oven. The valve seats are made of aluminum bronze which has practically the same coefficient of heat expansion as the aluminum head. The spark plug bushings are also of aluminum bronze and are screwed in place while the cylinder is hot, thus giving good mechanical and thermal contact with the cylinder wall.

By the use of this construction it is possible to keep both the valves and the spark plugs relatively cool, since they are in close proximity to jacket water which circulates completely around them. The cylinder sleeve, which is also inserted while the cylinder is hot, projects about two inches into the crankcase, and is provided with a narrow flange which is clamped between the cylinder and crankcase.

Each cam box is a single casting extending the entire length of two cylinder blocks. The inlet manifold, cast integral with this box, helps to stiffen it and thereby stiffen the entire engine. It will be noted that the inlet passages connecting the manifold with the combustion chamber are cast integral with the cylinder head. The valves are inclined and are formed with hollow stems which bear in long inserted guides. There are two inlet and two exhaust valves per cylinder, each being fitted with two concentric springs. All valves are made of stainless steel. The rocker arms are short and are pivoted on light steel tubes running parallel to and on each side of the camshaft. These tubes extend half the length of the cam box to facilitate their ready removal, but are connected in such a way that oil can be fed through them under pressure. Holes are provided for lubrication of the rocker arms and leads carry oil also from the tubes to the camshaft bearings. The oil is led through one of the hollow pivot tubes from end to end of the cam box and returns through the second tube to the end from which it started. The rocker arms are drilled to provide oil passages to the cam followers and cams. Oil which escapes from the pressure system into the cam box flows to either end of the latter and is drained through external pipes to the crankcase. Tappet adjustment is provided by a screw in the end of each rocker arm. The camshafts are hollow and are provided with four plain bearings of 12 per cent copper-aluminum alloy which metal is used in several places instead of the bronze ordinarily employed for this purpose, thus saving considerable weight. It will be noted from the accompanying cut of the cam box and camshaft that the latter is provided with two large central bearings of a diameter slightly larger than the outer diameter of the cams. These bearing surfaces are formed by shrinking over the camshaft two pieces of steel tube. The tube is supported on light flanges turned integral with the camshaft, thus saving considerable weight which would be added if the camshaft were made solid at the bearings. By following this construction, it is possible to use one piece camshafts of relatively light weight and at the same time give large bearing surfaces and facilitate accurate machining and alignment of the bearing surfaces.

Oil Leakage Avoided

Each cam box is provided with two light aluminum covers which enclose the entire valve actuating mechanism and effectively prevent oil leakage to exterior of engine.

The aluminum pistons are quite conventional in design, having a heavy dome shaped head with skirt of tapered section. There are three rings above the piston pin and one scraper ring at the lower end of the skirt. The piston pins float in both rod and piston bosses. They are retained by bronze plugs pressed into the end of the hollow pin. Connecting rods are of tubular section finished all over and provided with bronze bushings fixed in the upper end. The hole in the connecting rod is drilled from the upper end.

A simple and very satisfactory type of bearing is employed at the lower end of the rod which is of the serrated

type. The bearing is a split sleeve about 3/8 in. thick and is cast from a new copper-lead-tin alloy. The surface of this metal forms the bearing, no babbitt being required. The inner surface, of course, turns on the crank pin while the outer surface is formed in two diameters, which can be accurately ground to size. The two steps of large diameter are clamped between the halves of the forked rod while the smaller diameter fits closely the rod which turns on the outside of the box. This construction is unusually rigid and can be readily finished to the desired size by grinding, thus assuring unusual accuracy in fit. The metal is said to be of such quality that it cannot score the parts which bear upon it.

The crankshaft is quite conventional in design except for the fact that it has an unusually large diameter, 3 in. at the main and crankshaft bearings. It is made hollow for lightness and to enable pressure lubrication. The plugs used to close the hollow ends of the crank throws are readily removable to facilitate cleaning. There are seven main bearings, the center bearing being unusually long. The propeller end of the crankshaft is provided with seventeen splines, the space in which the eighteenth groove would normally be cut being left blank in order to make it necessary to put the hub on always in the same position. The splines are made straight and are intended to take torque only, the axial position and centering of the hub being determined by two sharp cones, one at each end of the spline.

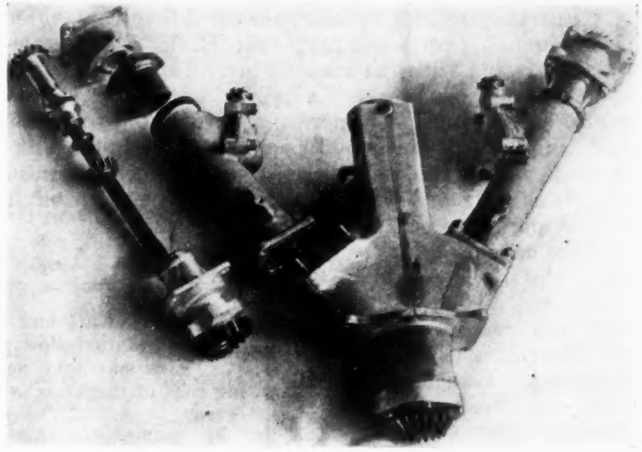
How Stiffness Is Attained

Since stiffness is a prime requisite in an engine of this class, the aluminum crankcase is made with a rather heavy section and is well ribbed. The block cylinder construction and one-piece cam boxes also aid in giving stiffness. All bearings are carried in the upper half of the crankcase, the lower half forming only dry sump from which the oil is pumped as rapidly as it is thrown off from the bearings. The lower caps of the main bearings are aluminum forgings. By the use of this construction the bearings are made relatively accessible after removing the lower case. It will be noted from the transverse section of the engine that the carbureters are secured to the lower case and that this, as well as the upper crankcase, is cored to form a passage through which the mixture from the carbureter is drawn to the inlet manifold. To the upper end of this cored passage is attached a short length of light tubing connecting the passage to the inlet manifold. If, however, it is desired to use a carbureter located in the Vee, side openings into the manifold can be employed, although this renders the inner spark plugs less accessible than they would otherwise be. At the front end of the crankshaft there is provided a deep row radial thrust bearing which positively locates the crankshaft endwise.

Among the most interesting features of the engine is the layout of gearing for driving the camshafts and accessories. Practically all the bevel gearing is mounted in readily detachable housing units. As will be noted from the photographs and drawings, a vertical shaft with a bevel gear at its lower end is driven off the crankshaft and from this shaft are driven in turn the two magnetos and two inclined shafts which drive the camshafts. The inclined shafts are provided with serrated couplings which facilitate accurate timing of the valves. From the inclined shafts are driven the two gun synchronizers required on engines for the Navy Department. The vertical shaft terminates in a bevel gear from which either a generator or fuel pump located in the Vee of the engine can be driven if desired. From the lower end of this vertical shaft, and driven by the same crankshaft bevel gear, is another shaft which drives the three oil pumps and the horizontal centrifugal water pump. A blank cover opposite the end of the crankshaft is provided, and at this point either a hand or electric starter can be attached if desired. The compact location of the distribution gearing and accessories accounts in large part for the relatively short length of the engine.

The water pump is provided with two outlets to which are connected two short manifolds which deliver water to the center of the base of each of the four cylinder blocks. Water outlets are located at the propeller end near the top of the jacket.

There are three oil pumps in a single assembly. One of these draws oil from the front and one from the rear end of the lower case and delivers it to the external tank or radiator while the third draws oil from the tank and delivers it to the bearings under pressure. After the oil leaves the pressure pump it passes through a tubular strainer arranged transversely in the lower half of the crankcase and thence to the oil manifold cast in the upper half of the crankcase from which it is distributed to all crankshaft bearings. Piston pins and pistons are lubricated by splash. Outside piping is used to convey oil to the cam boxes. The oil returns to the sump by gravity after lubricating the inclined shafts, gears and bearings in its downward path. The pressure employed in the



Vertical and inclined shafts with bevel gears for driving camshafts and accessories. Note convenient unit housings which provide ready accessibility

lubricating system is 50 lb. per sq. in. and is controlled by a by-pass valve located at one end of the oil strainer.

Ignition is provided by two Splitdorf, model SS, twelve-cylinder magnetos. One of these fires all of the plugs located in the Vee, while the other fires all of the outside plugs. The two separate Stromberg carbureters, bolted to the bottom of the crankcase, are provided with the necessary control rods and bell cranks to bring the controls to the rear of the engine. These fittings are carried in bosses cast especially for this purpose on the bottom of the crankcase. Mixture issuing from the carbureters is heated by contact with the walls of the cored passage in the crankcase and the oil heated cambox passages as well as by passage through the water jacketed head of the cylinders. The engine is, of course, designed for operation on aviation gasoline without the use of anti-knock or other non-detonating fuel.

It will be noted that the water and oil pumps, magnetos and other parts, such as spark plugs, crankcase bolts and oil strainer, are readily accessible to facilitate their removal when this is required.

This engine, which is known as Model T2, is reported to have run for a total of 50 hours, averaging 500 hp. at 1800 r.p.m. During this run the average fuel consumption was 0.48 lb. and the oil consumption 0.02 lb. per b.hp. hr.

British Racing Cars Show Unusual Design Features

Vauxhall engine has flywheel located in the center of crankshaft. Sunbeam uses two overhead camshafts offset with respect to center line to permit use of larger inlet than exhaust valves. The steering wheel has laminated steel spokes intended to absorb shocks.

By M. W. Bourdon

TO participate in a British race for 3-litre cars, three Vauxhall cars were prepared; H. R. Ricardo collaborating with the manufacturer's engineers. The engine is a four-cylinder, 3⅜ x 5¼ in. unit, and is said to develop a maximum horsepower of over 110, while its speed range runs beyond 4500 r.p.m. An aluminum cylinder block with steel liners is used, with detachable head for each pair. Ball bearings are used for the crankshaft journals and roller bearings for the big ends.

Rather unusual is the position of the flywheel, which is in the center of the crankshaft, the crankcase, therefore, being of unusually large dimensions. Overhead camshafts are used with four valves per cylinder; there are two Zenith carbureters, one for the end cylinders and the other for the central pair; ignition is by Delco coil and battery, the contact breaker and distributor unit being in triplicate, with three spark-plugs per cylinder. As a safeguard two entirely separate fuel feed pipes are installed, the piping being that flexible gut material known as Petro-Flex. The oil pump delivering oil to the bearings is duplicated, and a separate gage for each pump faces the mechanic's seat.

DESIGNERS and engineers who are accustomed to follow the performance of racing cars may take particular interest in watching that of the Vauxhall cars in coming European races.

H. R. Ricardo, the British engineer who has done so much to advance engine design, has collaborated with Vauxhall engineers in producing the latest racing cars bearing that name, and much may be expected from them.

It is to be noted that both the Sunbeam and Vauxhall cars are fitted with four-wheel brakes, but their construction and method of control is different. This brake system appeared on only three of the recent Indianapolis contestants and is still more of a European than American practice.

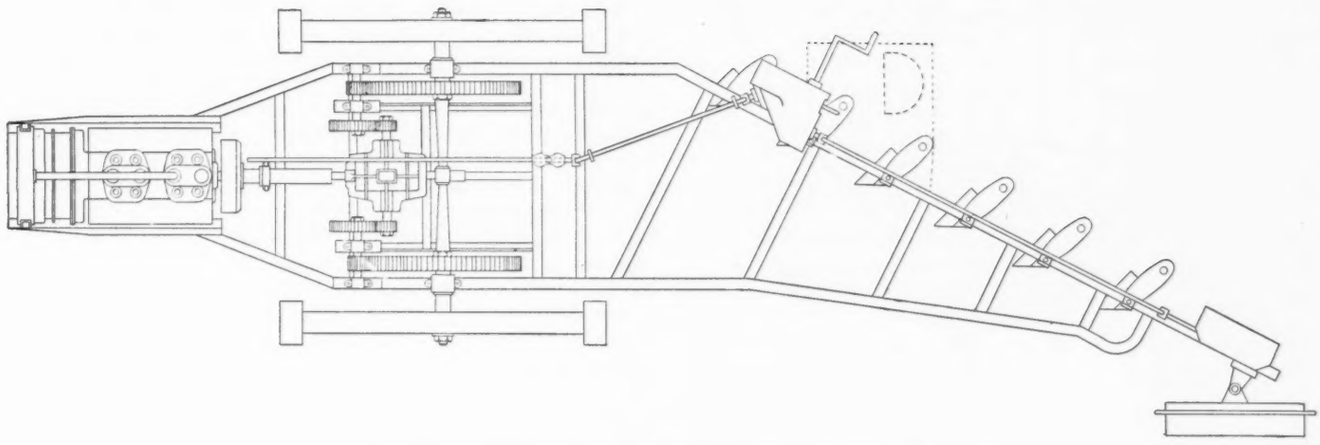
A plate clutch is used with an unit construction of engine and four-speed gearset. There is nothing unusual in the transmission, which is by means of an open propeller shaft, with a fabric disc joint at the front and a sliding pot joint at the rear. Driving torque is taken by a special torque member, though the rear braking torque is taken by the semi-elliptic springs.

It need hardly be said that four-wheel braking has been adopted, though there is something unusual in the controls of the brakes. The side lever operates the rear wheel brakes only; the pedal brings into use the front brakes, while in place of the usual throttle control over the steering wheel is a lever which brings all four brakes into use by air pressure.

For a French 2-litre race an entirely new Sunbeam chassis has been made, with four cast iron cylinders having a fixed head and a bore and stroke of 2 11/16 x 5⅜ in. In this case also there are four overhead valves per cylinder and two overhead camshafts, but the positioning of the latter is unusual in that to enable the inlet valves to be larger than the exhaust, the camshafts are not placed symmetrically with respect to the center line. Plain bearings are used for the big-ends, but the crankshaft runs on three sets of ball bearings and is a built-up construction. Two magnetos are used, with two spark-plugs per cylinder and two Claudel racing carbureters for the mixture supply. Lubrication is on the dry sump system.

On this chassis the brakes on all four wheels are applied simultaneously, by the pedal, which operates through a friction relay or Servo system. There is no separate control of the front brakes but the rear ones can be applied independently by a hand lever. To resist the torsional stresses arising from the front brakes a special type of front axle is used. This consists of an H section central member terminating inside the spring pads in circular flanges. A second forging is bolted to each of these flanges and forms the spring pad and also the extension for the swivel pin. These axle ends are machined to a tubular section. Another divergence from ordinary practice is found in the steering wheel, which has laminated steel spokes to allow a certain degree of flexibility and relieve the driver's arms of shocks.

The foregoing description of the Vauxhall engine should be of particular interest to those who have followed the fuel research work done by Ricardo, since it is presumed that it embodies a construction such as to be affected to a minimum degree by detonation difficulties. The use of three spark plugs in so small a cylinder is significant in this connection. Friction has also been reduced to a minimum, it would seem, by the use of ball and roller bearings on the cranks and main bearings.



Plan view of Stock motor-driven plow built in Germany

German Motor Plow Design Provides for Variety of Work

Combines plow with two-wheel tractor. Construction makes weight of plow and plow carrier available for traction purposes. Low speed engine used. Can be used for belt work or for hauling.

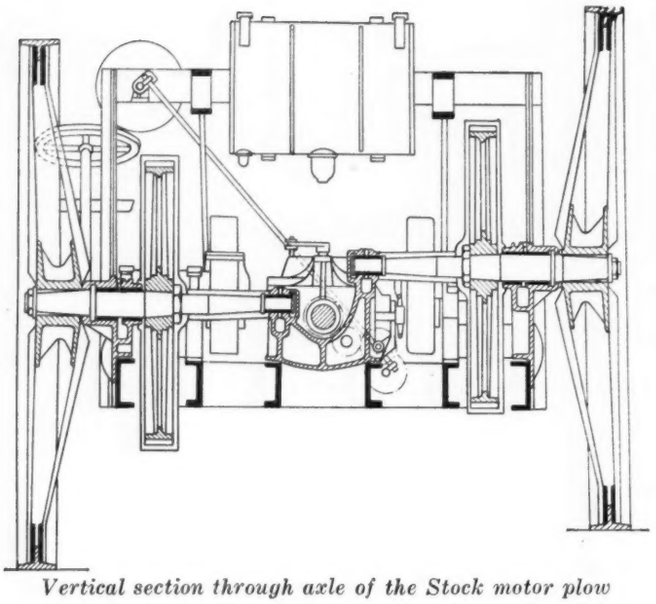
By P. M. Heldt

A TYPE of agricultural power machine entirely different from the conventional farm tractor has been developed in Germany and is there known as a motor plow. The first machine of this type was brought out by Robert Stock of Berlin in 1909, and the Stock Motor Plow Co. is still one of the leading concerns in this branch of the tractor industry.

These motor plows generally comprise two large driving wheels, 86 in. in diameter in the larger sizes, with a frame hung from the wheel axle or axles. Forward of the axle the frame is rectangular, and a considerable distance ahead of the axle it carries the motor. Back of the axle the frame is in the form of a triangle with one angle larger than 90 deg. The frame member opposite this large angle, which constitutes the long side of the triangle, carries the moldboards, while at the rear corner of the frame is mounted the third or steering wheel. The moldboards are rigidly secured to the frame, and are lowered or lifted out of the ground by raising or lowering the frame relative to the steering wheel.

Owing to the fact that the plows are rigidly connected to the wheeled frame, the latter must be kept parallel with the ground in order that all of the bottoms may cut furrows of equal depth. In practically all of these motor plows one of the driving wheels travels in the furrow, and therefore has to be set lower than the other wheel relative to the frame. This necessitates the use of a separate axle for each wheel. In most of the motor plows the difference in level between the two wheel axles is set once for all, to correspond to the average depth of plowing, while in others it is adjustable so as to keep the plow frame parallel with the ground when the depth of plowing is changed.

The chief objects in developing the two-wheeled motor plow seem to have been to make practically all of the weight of the plow carrier and plow available for traction purposes and to take advantage of the greater maneuverability of a self-contained machine as compared with a tractor and plow. In the original Stock plow only 1200 lb. out of a total of 13,200 lb. came on the steering wheel when the plow was at rest. The 86-in. wheels of this tractor had rims 6¼ in. wide, which were provided with angle iron lugs overhanging the rims 4 in. on both sides. The engine was a four cylinder type of 42-hp. with separately cast cylinders. This first Stock plow had only one forward speed and no reverse, but these deficiencies soon made themselves felt, and in later models a variable speed and reverse gear was provided. The first reduction was through a pair of bevel gears and the second through a pinion and internal gear. It has already been stated that the two driving wheels were not in line, one being placed lower than the other. In order to obviate the need for universal joints in the differential shafts, the two rear wheels were displaced also in a horizontal plane, so that the pitch circles of the two internal gears cut each other in the axis of the differential shaft. The rear steering wheel was provided with a skid ring so as to give fairly positive steering in spite of the small weight on this wheel. An implement type of seat was supported from the frame, extending sideward from the plow supporting beam, so that the driver rode over the plowed ground. Adjacent to him he had the clutch lever and the plow lifting lever.



Vertical section through axle of the Stock motor plow

The frame of a machine of this kind has a tendency to turn over backward in plowing and forward when backing. It is immediately apparent that there is no possibility of the plow overturning backward, but the tendency to tip over forward when backing gave considerable trouble at first. It is this proclivity of the motor plow which explains the heavy trussing under the frame, the need of which may not be directly apparent.

As pointed out, the Stock was the prototype of the whole class of motor plows now made in Germany. Later designs, of course, showed a number of variations in the general layout and many improvements in details. Thus, some of the plows are now made with a separate plow frame independent of the driving gear frame or main frame. This separate plow frame was introduced by Wendeler & Dohrn. In their tractor it is linked to the main frame and can be adjusted vertically by means of a nut on a horizontal screw spindle. Other manufacturers use a pinion and rack for the plow lift.

The engines of these motor plows are low speed machines, which is almost necessary on account of the very large driving wheels used. Most of them run at about 700 r.p.m. On the earlier machines the radiator was placed in front, but several of the more recent models have the radiator to the rear of the engine in a more protected position.

The majority of the motor plows are quite large machines. Stock, for instance, at present furnishes two sizes, with ratings of 50-55 and 70-80 hp. respectively. Lifting a six-bottom plow by hand is not an easy task and it soon became evident that hand lifting was not very practical. Since 1914 most of the manufacturers, therefore, furnish power lift, except in the case of the smaller machines. This power lift device consists essentially of a reversible gear with clutch, connected to the mechanism—often in the form of a screw and nut—which displaces the steering wheel relative to the plow frame. The clutches of the reversing gear are controlled from the driver's seat. Before power lift was definitely adopted, many users of these plows used two men for operating the plows, one attending to the driving and the other to raising and lowering the plows. One Austrian manufacturer, Rudolf Bacher, brought out a plow designed for operation by two men, the plow operator's seat being so arranged that he looked backward over the plowed ground, so that he could always observe the kind of work that was being done. What increased the difficulty in operating the plow by hand was that just at the moment when the plow has to be lifted out of the ground the operator is busy with his steering gear. An expedient to reduce the effort required to lift the plow, resorted to before the introduction of the power lift, consisted in the provision of a spring which neutralizes most of the weight of the plow.

Komnick of Elbing originally built a two-man plow, but in 1915 introduced a one-man plow with power lift. The first Komnick power lift model had a rating of 80-100 hp., its engine running at 900 r.p.m. The steering wheel was raised and lowered relative to the frame by means of a screw and nut, worm and wheel mechanism. This motor plow had the radiator back of the engine.

Scheffeldt of Coburg manufactures a small motor plow of 25-40 hp. rating. The engine is located at the forward end of the frame and the driver sits directly over the steering wheel. The steering wheel column is connected through a short chain to the shaft of the steering handwheel. Adjacent to the driver's seat is located the screw spindle for lifting the plow by hand. The simplifications in the steering and plow lift mechanisms reduce both the weight and the manufacturing cost.

In the fall of 1919 an agricultural machinery and implement show was held in Magdeburg, and at this show motor plows were represented in about the same number as the more familiar type of farm tractor. Most of the machines which have originated in Germany since the war have been of the tractor type, however, either wheeled or crawler. There are altogether about half a dozen manufacturers of motor plows in Germany and these machines are well known, not only in Germany but also in the large agricultural states which import most of their machinery. There are also two motor plows manufactured in Czechoslovakia, the Excelsior and the Praga. Practically all of the makers put out two sizes, a 5-6 bottom plow with a rating of about 80 hp. and 3-4 bottom plow rated at from 30 to 45 hp. in the different makes. Some of the recent improvements in these motor plows are as follows:

Plows Mounted on Separate Frame

Komnick has discontinued the plan of lifting the plow by changing the height of the frame relative to the steering wheel. He now mounts the plows on a separate frame or beam provided with two vertical posts which extend up through hollow columns on the main frame and can be raised and lowered relative thereto by means of screw spindles and nuts. The plow lift columns are made very massive so as to be able to withstand the strains imposed by the plow draft without distortion of the frame. The air is filtered through a cloth type air cleaner. Neither holes nor slots are required in the wheel rims for the attachment of the driving lugs. These lugs are placed against the wheel rims from the outside, yokes are placed against the rims from the inside, and the two are clamped together by bolts beyond the rim. Of course, the lugs are held on only by friction, but this seems to have proven satisfactory.

On the Akra plow, manufactured by the Kyffhäuserhütte, which has a 25-hp. rating and is the smallest motor plow made, the plow frame, instead of being hung on three racks, as in the past, is now swung in forks at the front and supported on a rack only at the rear, this rack being raised to lift the plow out of the ground. A spring compensates for the weight of the frame and makes it easy to lift the plow by hand. The drive wheels are vertically adjustable, so that the plow frame may be horizontal no matter what the depth of plowing. The plow frame can slide horizontally on its supports and is placed in driving connection with the main frame through a spring so as to relieve shocks in starting and when striking obstacles. This machine weighs 5500 lb. and is the lightest motor plow made.

The Scheffeldt G. m. b. H., which came out with a 3-bottom motor plow in 1914, changed to a 4-bottom plow in 1919, the machine weighing 4 tons and having a rating of 60 hp. In this case the depth of furrow is changed by raising and lowering the drive wheels and the steering wheel simultaneously, the machine remaining level under all conditions. The driving wheels swing around the jackshaft axis and are braced by radius rods which also serve for adjustment. A rather unique feature of this machine is the arrangement of the steering wheel, which runs in the furrow of the third (next to the last) bottom. This serves to guide the machine effectively, and at the same time it keeps the last furrow in shape for the right front wheel to run in the next time around. It is claimed that if this last furrow were disturbed by the steering wheel it would not guide so well.

There is a disadvantage, however, in running the steering wheel in the furrow, as it results in uneven depth of plowing if the ground is at all uneven.

In their latest models, adjustment of depth of plowing is effected by changing the setting of the wheels by Stock and Scheffeldt, and by means of a separate plow frame by Wendeler-Dohrn, Komnick and Akra.

Objections to the construction in which there is a separate plow frame below the main frame are that it necessitates a high main frame and that it is heavy. This is claimed to have been overcome by the Bussard Motorplow Co. in Hanover by means of a construction in which the plow frame is linked to the main frame at the rear. At the rear of the plow frame there is the usual steering wheel, and the front end of the plow frame can be lowered relative to the main frame, and the rear end of the plow frame relative to the steering wheel by equal amounts. The plow bottoms of the Bussard are elastically connected to the plow frame so that they will not be injured when striking an obstruction. When striking a rock, for instance, the resulting pressure lifts the plow over the obstruction.

The Komnick motor plow has recently been offered in South Africa at what is a very low price for that market, namely, £530. This is a 3-bottom machine and weighs 4 tons. The large Komnick plow, a 6-bottom machine weighing 8 tons, sells at £850 there. Both operate on kerosene. One objection to the machines is their huge size, which is apparent from the photograph reproduced herewith. A correspondent of AUTOMOTIVE INDUSTRIES reports that in a test in grass land the larger of the two machines easily pulled its 6 bottoms at a depth of 11 to 12 in. and plowed 2 acres per hour. Although the weight is great, it is claimed that there is no soil packing, owing to the large diameter of the wheels. The machines turn in their own length.

Our correspondent writes that these machines have made a very favorable impression in the South African market, the prices of other machines of similar capacity running much higher, but he concludes that once the mark begins to appreciate it may be impossible to sell at the present low price.

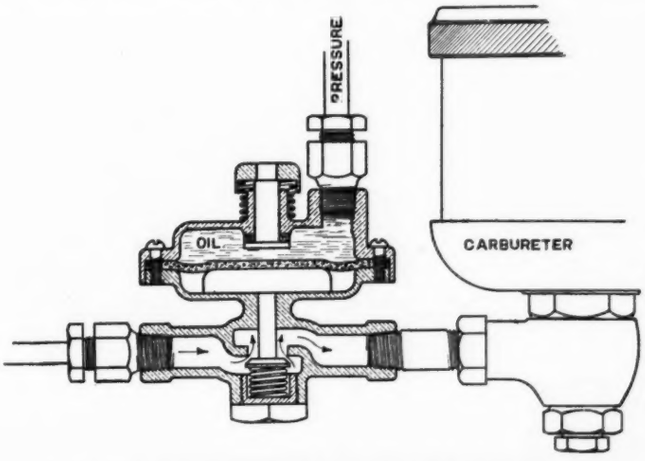
These motor plows are not limited to a single line of work. They can do belt work as well as tractor. A harrow or disk roller can be attached every third time around in plowing, and the machine can also be used for hauling wagons or trailers, although the plows must first be removed when such other work is to be done.

Safety Device for Pressure Lubricated Engines

A DEVICE known as the Lubritector, designed to shut the engine down automatically as soon as the lubrication fails, has been placed on the market by the Pierce Governor Co.

The apparatus consists of a poppet valve in the fuel line close to the carbureter which is normally held to its seat by the pressure of a light coiled spring. The stem of the valve enters a diaphragm chamber in which there is a leather diaphragm. To the upper portion of this chamber, above the diaphragm, the oil of the lubrication system has access, and the pressure of this oil (in a pressure lubricating system) will open the valve and allow the fuel to flow to the carbureter. But if the oil supply runs low or the circulation fails for any reason the spring will immediately shut the valve and thus cut off the fuel supply.

An extension of the valve stem extends through the cover of the device, and if the engine should stop and the driver not know the reason, he can easily make a test by depressing the knob on top of the stem. If the engine starts and then stops again as soon as the amount of fuel admitted to the carbureter has been used up, it is a sign that there is something wrong with the lubrication.



Pierce Lubritector for shutting off fuel when oil pressure fails

Improvement in Spring Covers

THE spring covers of the Woodworth Specialties Co. are now being made with an oil cup for replenishing the oil, so that the felt pad can be kept saturated with oil and the spring thoroughly lubricated. These covers completely cover the springs from the clamped thick part to the spring eye. They have a felt lining by which the oil is absorbed, and they are made in two grades.

Woodworth spring cover

Seam Lock Is Feature of New Radiator Construction

Sections held together by lock. Solder acts merely as a seal. Brass or copper used in making up core is not stretched during construction. Novel machinery utilized in manufacture. Core specially adapted to motor truck use. Not injured by freezing.

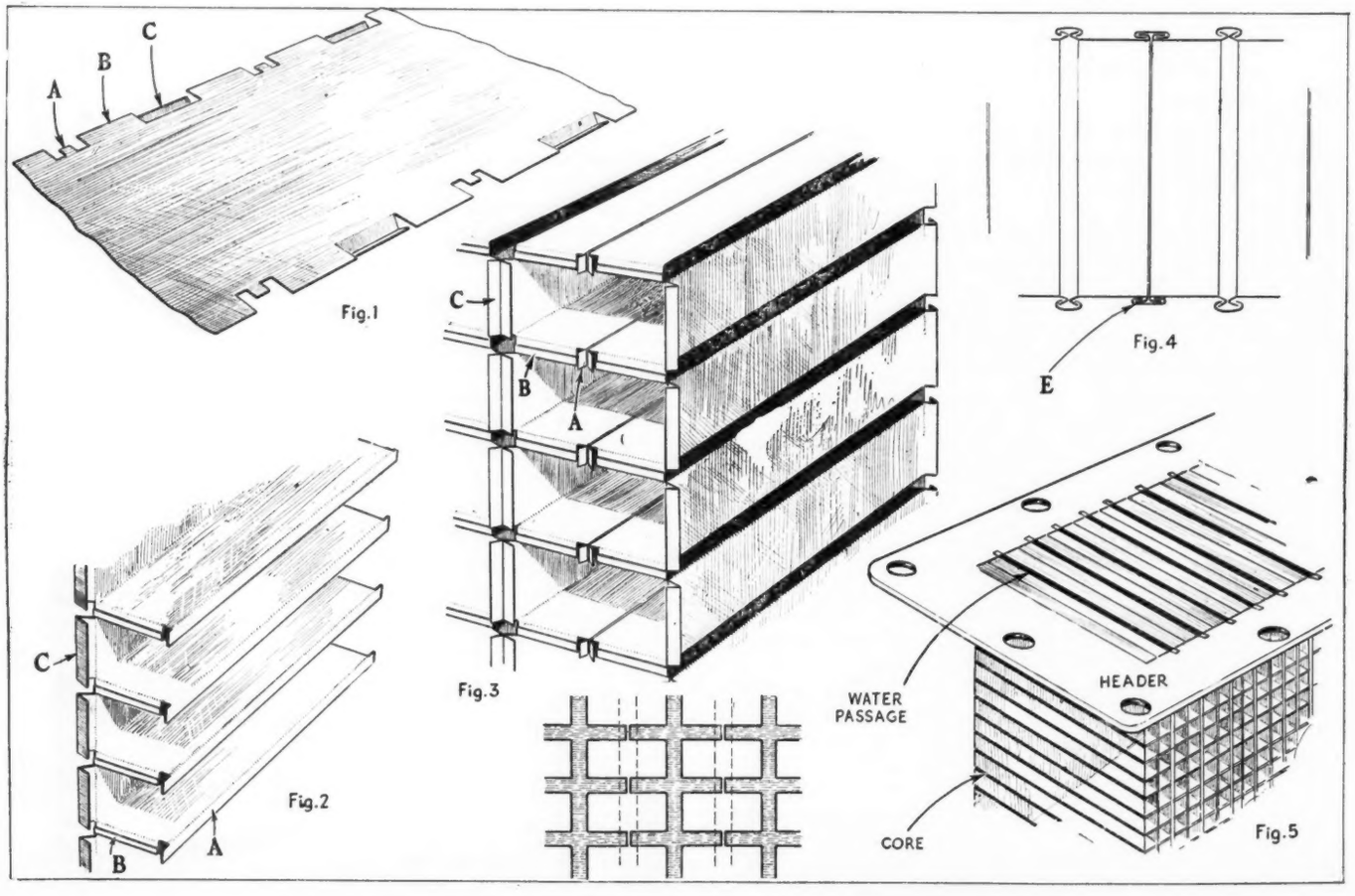
By B. M. Ikert

THE Rochells radiator, made by the Rochells Mfg. Co., incorporates a unique method of construction, and four advantages are claimed for it, namely, maximum strength, maximum radiation, minimum weight and minimum cost. Probably the most interesting feature of the construction, and which contributes chiefly to its strength, is the patented channeled seam lock. This holds each seam securely, and solder is not depended upon to hold the sections together. The solder acts as a seal only, to take care of minute openings in the core.

It is interesting to note that in making up the core the metal is not offset or stretched in any way, which might tend to destroy its ductility. Only right angled bends are used. As a result, it is claimed, the core will withstand certain kinds of abuse (indentations) without leaking, because the metal readily gives, not having been previously deprived of its ductility.

Either brass or copper, 0.005 in. thick, is used, and the construction is such that the core will not burst if the water in the passages should become frozen, because the layer of ice would be only 1/16 in. thick.

From the cross sectional views it will be noted that both horizontal and vertical cells are live. This design is said to afford much greater cooling surface per cubic inch than conventional types of core.



Detail views showing form and construction of the new Rochells radiator

The machinery for making the core is novel in itself. The first operation consists of running the brass or copper through a combination punching and forming die. Fig. 1 shows the metal as it looks after the punching operation, while Fig. 2 shows the strip after passing through the forming die. The reference letters indicate how the metal is shaped from the flat strip. For a 3-in. core the strip is 3 in. wide, for a 4-in. core it is 4 in. wide, etc.

After the strips have been formed, as shown in Fig. 2, they are locked. Two strips which have previously been cut off to a length which corresponds to the height of the core, are laid back to back in a machine, so that the tangs A are directly opposite each other. The seam locking device then feeds a ribbon of brass around the tangs A, and after a roller has flattened the seam it has the general appearance shown at the point E in Fig. 4. Both sides of the strips are seamed or joined at the same time.

The other seams, those at the water passages, are locked by a similar machine, but in this case it is necessary to insert a strip of steel 1/16 in. thick (corresponding to the water passage) between the section, which is withdrawn after the joint has been made. The steel piece offers a suitable surface for the roller E to crush against and thus flatten the joint.

When the core has been completely assembled it is placed in a jig over a bath of molten solder. The core is lowered horizontally and slightly dipped into the solder, thus sealing it against any small leaks. The strength of the core will be appreciated when it is considered that no box is necessary to retain its shape while the dipping process goes on.

The core is particularly suited to the requirements of motor trucks, and tests have shown that after long periods of use no disintegration of the sections was in evidence. For trucks and tractors the company flanges each section through the plates in addition to soldering. This construction virtually makes the plates integral with the core, thus adding to the strength.

$190,000,000 Authorization Aids Road Construction

FEDERAL aid for road construction will be continued as a result of the authorization of additional appropriations for this work amounting to $190,000,000 carried by the Post Office appropriation bill signed by the President June 19. Fifty million dollars is authorized for the fiscal year beginning July 1, this year, and $65,000,000 and $75,000,000, respectively, are authorized for each of the two succeeding fiscal years. In addition, $6,500,000 is authorized for forest roads for each of the two fiscal years beginning July 1, 1923, and July 1, 1924. The funds will be administered by the Secretary of Agriculture through the Bureau of Public Roads.

The apportionment to be made to the various States is approximately as follows:

	Fiscal Year Ending 1923
Alabama	$1,035,614
Arizona	702,188
Arkansas	836,095
California	1,641,399
Colorado	894,117
Connecticut	320,599
Delaware	243,750
Florida	591,217
Georgia	1,331,972
Idaho	625,691
Illinois	2,164,187
Indiana	1,305,904
Iowa	1,401,915
Kansas	1,401,521
Kentucky	944,786
Louisiana	664,660
Maine	463,440
Maryland	427,086
Massachusetts	730,784
Michigan	1,499,688
Minnesota	1,415,731
Mississippi	863,271
Missouri	1,632,086
Montana	1,031,257
Nebraska	1,054,126
Nevada	635,624
New Hampshire	243,750
New Jersey	628,581
New Mexico	793,216
New York	2,464,299
North Carolina	1,139,556
North Dakota	776,476
Ohio	1,882,003
Oklahoma	1,168,226
Oregon	788,443
Pennsylvania	2,265,969
Rhode Island	243,750
South Carolina	707,492
South Dakota	802,707
Tennessee	1,098,461
Texas	2,950,115
Utah	566,278
Vermont	243,750
Virginia	971,219
Washington	735,806
West Virginia	534,906
Wisconsin	1,263,211
Wyoming	623,078
Total	$48,750,000

These funds must be matched by the States and will be administered subject to the general provisions already in force.

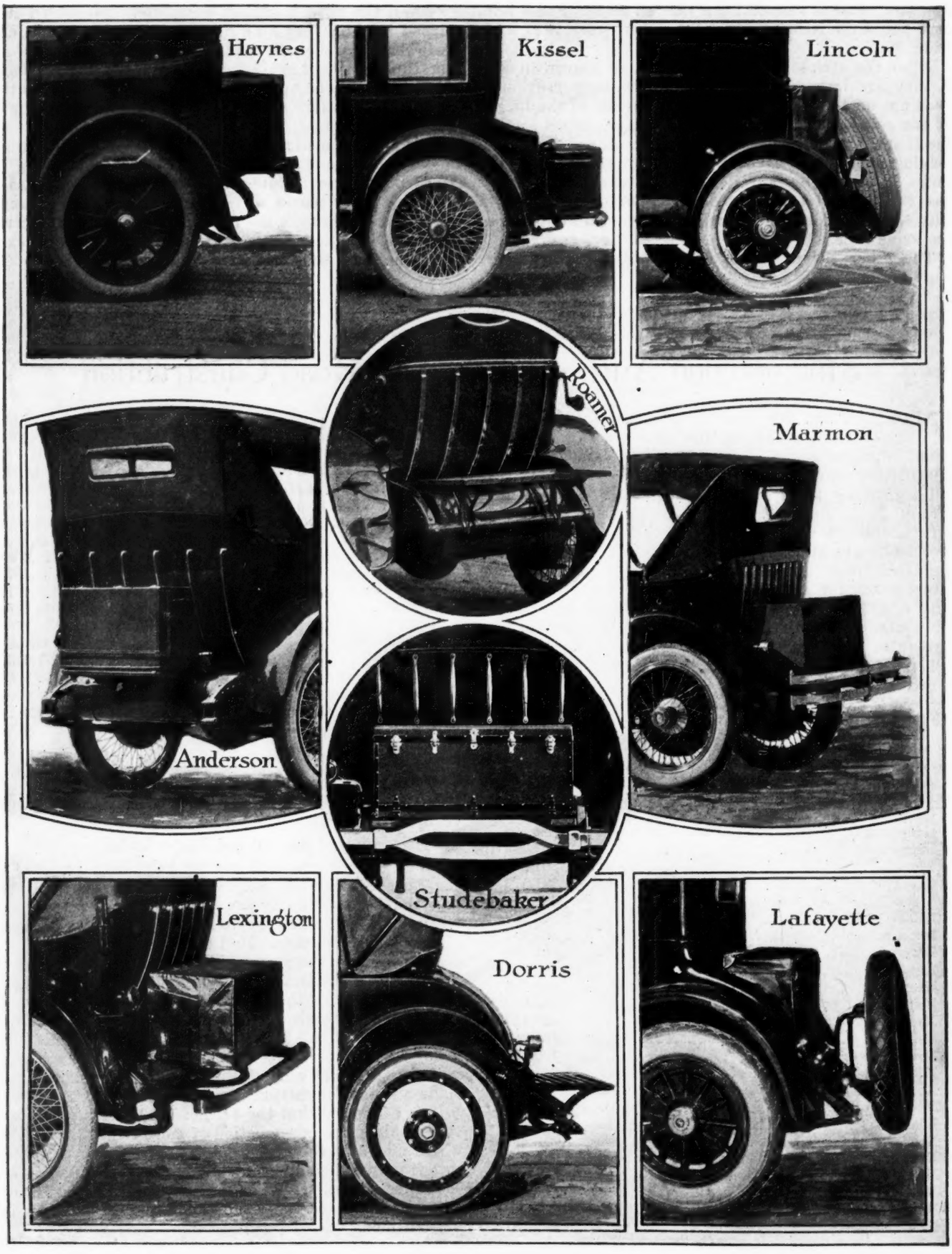
Plans Received from All but Eight States

Plans for the proposed system have been received by the Bureau of Public Roads from all but eight States, and the State systems are being coordinated so that when joined together they will serve the best interests of the whole country. In the meantime only projects certain to be on the proposed system are being approved.

The new appropriation comes at a time when several States are nearing the limit of funds available. The authorization of funds for three years in advance will be of great benefit to all States in that it will permit them to lay their plans for some time ahead. Uncertainty as to future Federal aid is removed and provision can be made at once for raising State funds to match it.

It is estimated that the $190,000,000 lately authorized will result in the construction of more than 25,000 miles, which added to the 46,000 miles that is expected to result from previous appropriations makes a total of 71,000 miles, or nearly 40 per cent of the estimated 180,000 miles of road in the system of Federal-aid roads now being outlined.

The Latest Styles in Trunk Racks



Increased Life for Tire Molds

Rough handling and constant temperature changes frequently result in breakage of tire molds, the average life of which is short. Effective repairs can be made by arc welding. Total repair cost on badly damaged $800 tire mold estimated at about $70.

By A. M. Candy *

THE average life of a good tire mold is estimated at approximately 60 to 70 heat cycles. The alternating heating and cooling which these molds undergo gradually cause the cast iron to crack and fail. The rapidity with which the molds are handled, moreover, subjects them constantly to rough usage, so that a large amount of breakage results.

Economical methods of repairing broken molds are of great practical interest, since these units cost as high as $700 or $800 each, owing to the large amount of hand work required to produce the intricate design desired for the tread of the tire. Such economical repairs can often be made by means of welding.

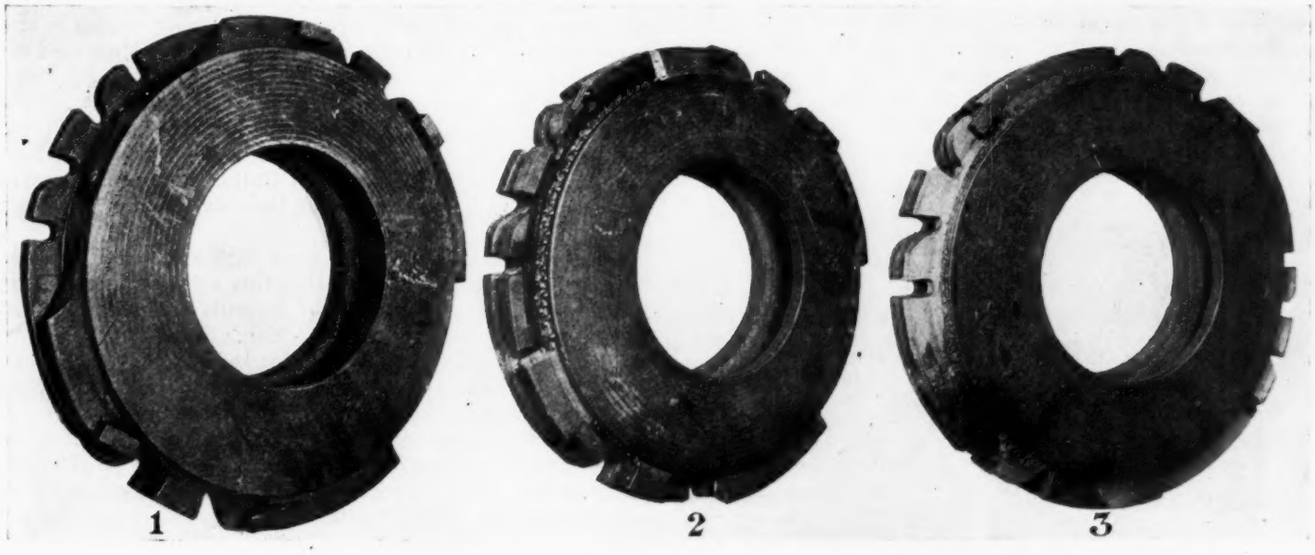
The mold is constructed in two halves provided with lugs around the outer edge so that the two halves of the mold can be held together by bolts, each having a T head. One face of these molds is a plain surface, as indicated by the front side of the mold, whereas the reverse face of the other half of the mold contains grooves so that a circulation of steam can be obtained when the molds are placed in the vulcanizers.

A mold which has been damaged severely in service and which would ordinarily be ready for the scrap pile is indicated by Fig. 1. It will be observed that the greater portion of the lifting lugs have been broken from the half of the mold on the side toward the observer. To properly repair this mold the surface at the broken portion of the casting was thoroughly cleaned off and a series of holes located on approximately 2-in. centers were drilled and tapped for inserting ½-in. diameter bolts. Ordinary machine bolts were then turned into these holes and cut off approximately ¼ in. above the surface of the cast iron. The next step in the operation was to prepare pieces of steel which could be substituted for the missing lugs, said pieces of steel being formed in the shape required for the finished lugs.

This piece of steel was beveled off along the inner edge, so that when it was placed in position formerly occupied by the original lug, the welding operation could be carried on along the beveled edge of the piece of steel and the surface of the cast iron containing the studs. One of these pieces of steel in position for the welding operation is illustrated by Fig. 2. This mold after being completely welded ready for service is shown by Fig. 3.

The operations involved and the resulting expense for repairing the mold illustrated is indicated by the following data. It must be borne in mind when going over this cost data that this mold was much more severely damaged than is usually the case. The preparation of the surface of the casting, including the drilling, tapping and

*Arc welding engineer, Westinghouse Electric & Manufacturing Co.



1—Tire mold rendered useless by severe damage received in service. 2—Broken mold prepared for welding. 3—Broken mold after welding is completed

setting of the 150 ½-in. studs was approximately 24 hours. Approximately 8 hours were required to form the pieces of steel necessary to replace the missing lugs. Approximately 40 lb. of welding wire were required to do the welding work, the time required for the entire welding operation being approximately 45 hours.

The welding time for such work as this is unusually long, because it is necessary for the operator to weld very slowly so as to reduce the heat accumulation at any given point to a minimum value, so as to have the cooling strains as small as possible to avoid fracture of the welding work when it is finished. The welding in this case was carried on, using approximately 150 amperes, the total power consumption being approximately 100 kw.-hr. The actual itemized cost of doing the complete job is indicated by the following table:

Preparation of casting, including drilling, tapping and setting bolts, 24 hours time at 60 cents per hour	$14.40
150—½" bolts at $2.00 per 100	3.00
Steel prepared for replacing lugs, labor 8 hours at 75 cents per hour	6.00
Cost of steel used in lugs, approximately	1.75
Welder's time, 45 hours at 80 cents per hour	36.00
40 pounds of welding wire at 8 cents per pound	3.20
100 kw. hours of power required from supply circuit at 5 cents per kw. hour	5.00
Grand total	$69.35

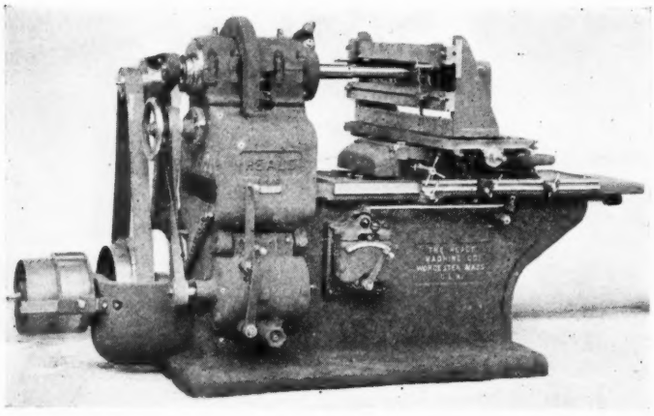
New Cylinder Grinding Machine Employs Hydraulic Drive for Main Table

A NEW cylinder grinding machine for automobile cylinders, which is both a manufacturing and regrinding tool, has been brought out by the Heald Machine Co. The machine is known as Style 50 and it is the company's present plan to discontinue the manufacture of its other styles, except possibly the Style 55, which is to be used for railroad work.

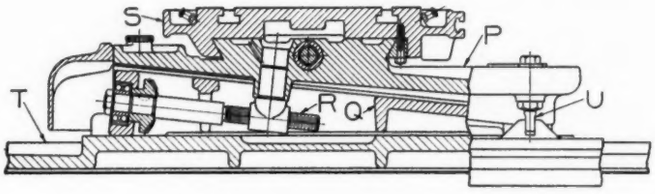
The new style 50 is a solid base machine, exceptionally massive and wide, so that it will take care of any size block that may be brought in to be reground. The rear shaft is mounted on ball bearings and driven directly from the main line. The head spindle has been made a little heavier, but the general design is the same as that previously used.

A most important feature, and said to be original in the cylinder grinder field, is the hydraulic drive for the main table. In trials given it this is said to have proven a very satisfactory drive. It makes it possible to get any speed desired from nothing up to the maximum, and, therefore, to get a very fine finish regardless of the material worked upon. This applies to steel cylinders as well as to cast iron. It is simple and silent in operation, and the operator can reverse the table at any desired point without shock or noise, it is claimed.

In addition to the vertical adjustment obtained by means of a universal locating jig, the cross slide table can be raised and lowered sufficiently to take care of any vertical adjustment that may be desired by the operator after the block is strapped to the jig. This is obtained by two inclined slides, P and Q, located between the cross slide table S and the main table T. By turning a small pilot wheel, which is connected by gear with the screw R, it moves the upper inclined slide P in a direction parallel to the main table. This upper inclined plate moves up and down on the inclined surface of Q, raising and lowering the cross slide table and work.



Front view of Heald style 50 cylinder grinder



Section through cross slide, intermediate and main table

Rubber as a Road Surfacing Material

EXPERIMENTS are being carried out by the Colombo municipality in the use of rubber as a road surface dressing, says Consul Vance, Colombo, in a recent report to the Department of Commerce. The dressing, which is the invention of a Ceylon rubber planter, is now being used on a portion of Darley road, which is one of the most used thoroughfares in Colombo. This solution was first tried on a road of the Devituraі rubber estate, where it has been in use for the past thirteen months. A short stretch was later laid in the municipality of Galle. The present test, however, is the hardest to which the new solution has been put.

The solution is made from pure bark and scrap rubber. The experiments so far show that this solution is easier to handle than tar. It is a secret formula and the inventor is still working toward its perfection.

The idea of using rubber for roads has been almost exclusively confined in the past to rubber blocks, the cost being very high. The cost of the liquid rubber road dressing is 50 to 75 per cent more than that of tar, but it is found that a tar dressing in Ceylon must be renewed every three or four months, while rubber dressing is expected to last from eight to nine months or longer. It is anticipated that a slight difference in the cost of material, in favor of the rubber dressing, will be found that labor cost will be reduced 50 per cent at least, and that a better road surface will be procured.

How Pressed Steel Wheels are Made

Recent machine tool developments add to manufacturing efficiency. Varied nature of press work shows wide possibilities in pressed steel production. Designers at work on machine to install, start, and finish rivets. Disk of tapered section is employed.

By J. Edward Schipper

NO phase in the fabrication of steel calls for more ingenuity than the manufacture of pressed steel parts. Some of the shapes which are now being made from pressed steel would have been considered impossible three or four years ago. These intricate shapes call for great accuracy and for very fine press and die work, and some which appear to be of the simplest form offer very complicated manufacturing problems.

A very interesting case in point is the Disteel wheel, which is manufactured by the Detroit Pressed Steel Co. The new dished wheel which this concern is manufacturing appears to be a very simple pressed steel shape, but because the disk is tapered to give a uniform fiber stress from the hub of the wheel out to the periphery, the manufacture is not simple. The work is very largely a press proposition and the machining operations, with the exception of that of putting the taper on the disk, are not of a very striking nature. The material used is .18 to .25 carbon, hot-rolled steel, typical side rail stock. From these sheets the blanks for the wheels are cut on a Toledo press, as illustrated in Fig. 1. The blank is merely a circular disk with a square hole in the center. This hole is punched, not only to determine the center of the disk, but also to act as a driving means for future operations.

The operation after blanking is turning the taper, which is done on an ordinary boring mill. This operation now seems to be very simple, but is the final result of an evolution of methods involving a tremendous amount of experimental work. All sorts of means were tried to get a proper method of giving an accurate and uniform taper on the disk before this simple method now used was finally discovered. As shown in Fig. 2, the boring mill itself has a straight transverse feed. The table of the machine is concave and in the center a fixture is applied and screwed down so as to spring the blanks or disks down to meet the concave table. The square hole in the center of the disk acts as the driving means and the cut is taken by two tools, one of which starts about half-way out toward the periphery of the disk and gives a roughing cut. The reason for this is that owing to the taper, if a single tool were employed, the cut would be too heavy toward the outside diameter where the blank is thinned down to the greatest extent. The two tools are mounted in the same post and the finishing cutter takes a light cut near the hub and follows along behind the roughing cutter, taking the finish cut all the way out to the outside of the disk.

After the taper has been cut, the disks are given a sort of preliminary forming operation. This consists of rolling them against a form, as shown in Fig. 3. The result of this rolling is a smoother surface on the disk. Moreover, the metal is stretched so that it can be accurately formed in the next operation.

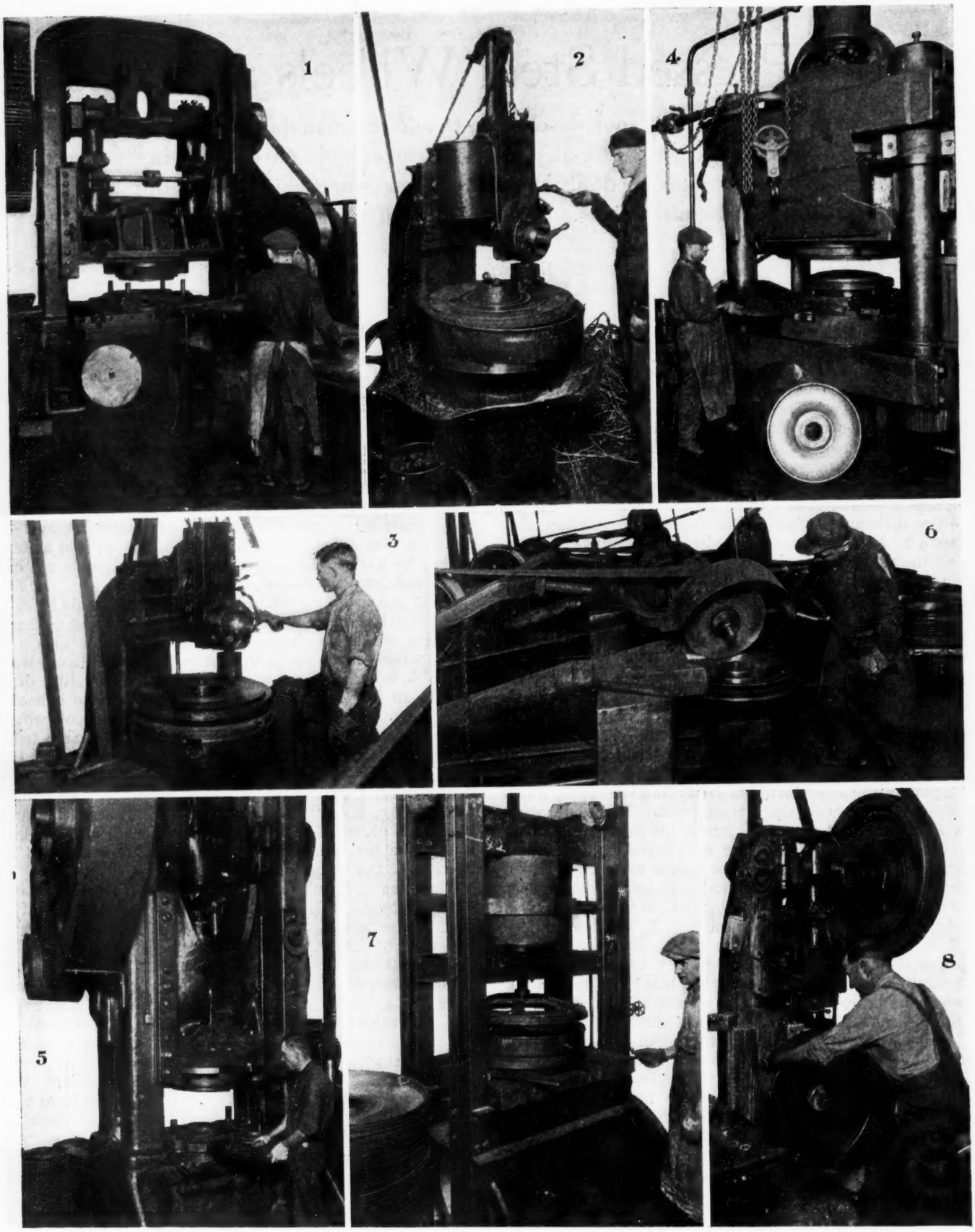
The actual forming is done on a 1500-ton hydraulic press. The work is illustrated in Fig. 4. This press has a sort of compound action first giving a relatively light pressure to give a preliminary form in the disk and then full pressure is thrown on to set the form permanently. The blank disk, after it has left the preliminary forming operation and the disk after it has been through this final forming, are both shown in the illustration. The forming operation leaves a flash on the disk which is trimmed off as shown in Fig. 5. This is simply a shearing operation which leaves the disk in finished form.

An improvement on the press shown in Fig. 5 is shortly to be installed to provide for the automatic removal of the flash ring from the cutting die. This will be accomplished by having the flash ring cut at two points so that it will fall from the die when the die is lifted.

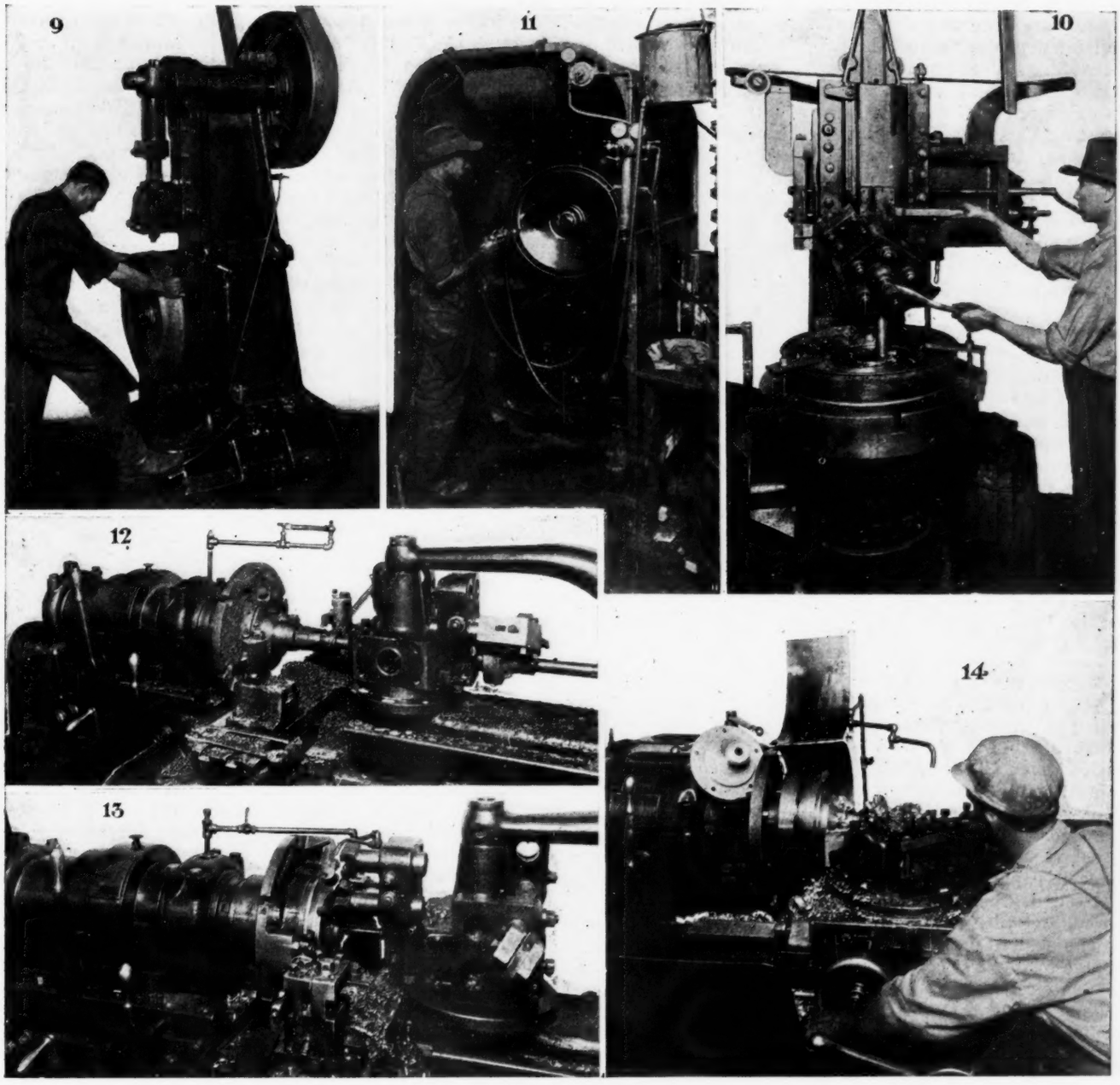
All of the disks are polished on the turned side to provide smooth surface for painting or enameling. These polishing wheels as shown in Fig. 6, are simply glue and emery wheels made up in the Detroit Pressed Steel plant. The disk is rotated at high speed and the grinding dust thrown off by polishing is ejected directly into exhaust pipes provided for the purpose. This arrangement, which is shown in Fig. 6, gives a clean room which is free from the grit particles usually found in a department of this kind. The disks are rotated horizontally against a table of proper form during the polishing operation. Following the cleaning, a complete inspection for concentricity and trueness is given. The finish on the surface is also checked up and the trueness of the holes, which were punched at the time of the trimming, is verified.

When the disk has reached the state of completion denoted in the foregoing, it is ready to be assembled to the rim. These are prepared for assembly in a separate department. The disks are pressed into the rim on the small press shown in Fig. 7. In spite of the care in manufacture of the rims up to this point, they are never quite round. Forcing the disk into the rim, however, makes the latter round and gives firm assembly. The toggle punch shown in Fig. 8 pierces and countersinks with a compound punch the holes for the rivets which fasten the rim to the disk. At present the rivets are slipped into these holes and started by hand and the assembly is then passed along to the riveting machine shown in Fig. 9 where the riveting work is completed. The tool designers, however, are at present engaged in a study of this operation for the purpose of determining whether it would be possible to design a machine which would install, start and finish the rivets. The difficulty is, of course, the putting of the rivets into the holes and upsetting them slightly so as to hold them in place before the heavy hammer finishes the operation. With the rivets temporarily in place, the rest of the operation is very rapid on the machine shown herewith. This is a No. 84 Consolidated riveting machine.

The facing operations shown in Fig. 10 are twofold



1—Blanking out the disks for Disteel wheels. The square hole in the center of the blank is for driving the disks on the preliminary operations. 2—Turning the taper on the disk. The disk is sprung down against a concave table, permitting of a straight cross feed on the boring mill bar. Note the two tools for rough and finish cuts toward the periphery of the disk. 3—Rolling the disk in a preliminary forming operation. 4—Forming the disk on a hydraulic press. This press first forms and then sets the disk. 5—Trimming the disk after it has been brought to form. 6—Polishing the disks on emery wheels. Note how the dust is thrown directly into exhaust cleaners. 7—Pressing the disk into the wheel rim. 8—Piercing rim and disk for rivet holes



9—Riveting the rim to the disk. 10—Facing the flange engaging surface so as to insure wheel running true with hub. 11—The wheels, before shipping, are given a coat of Arco primer. 12—Boring and reaming the hub for the Yellow Cab Mfg. Co. on Potter & Johnston machine. 13—Drilling and rough facing the Moon rear hub. This machine also finish turns the outside diameter and the brake drum flange. 14—The Dort rear hub requires a special forming operation because of the curved nature of its surface

in nature. First, the lip which is thrown up at the center hole of the disk is faced off to the proper depth and then the flange engaging surface is faced on a Colburn boring mill. This is one of the important features of Disteel wheel manufacture. The ability to hold the wheel true to the surface of the hub is one of the factors in making the wheels run true. The method used is claimed to produce 100 per cent true running wheels.

After reaching this stage of manufacture, all of the wheels are put through a Blakeslee washer with an alkaline solution which cleans them and puts them in condition to be sprayed, as shown in Fig. 11. All of the stock wheels are given a coat of Arco primer. This is a rust preventive and keeps the wheels in good condition for any color of paint job. After this final operation, the wheels are ready to be shipped.

One of the most important features in the steel wheel business is the manufacture of the hubs necessary for these wheels. These are straight machine operations on either forgings or malleable castings. Some of the hub designs are such that a forging is impossible, but they can readily be made from malleable. It is not purposed here to go to any length on a description of the manufacturing methods on these hubs, as with the exception of a very few operations, they are ordinary machine work without complications. A very good example of work on a forged hub is shown in Fig. 12. This is the boring and reaming operation on a hub for the Yellow Cab. Mfg. Co. of Chicago. The operation shown here bores and reams for the back bearing, turns the outside diameter on the flange and faces the bosses on one side and the flange on the other side. This is a Potter & Johnston automatic.

The operation shown in Fig. 13 is on a rear hub for the Moon car. The barrel is center spot drilled, the flange outside diameter turned, the flange rough faced and finish turned, rough reamed, and the ends of the hub rough faced. The brake drum diameter is turned to size, after which the machine finish faces both sides of the flange and finish reams. This is a turret lathe operation on a Potter & Johnston automatic. In taking care of the location of this work, the hub is chucked on the hub cap diameter.

Following the operations described, the hubs go to a lathe where they are located on a taper arbor and the brake drum diameter is turned concentric with the bore. The flange is also straddle faced for width and uniformity.

The final operation of locating in a fixture on the brake drum diameter is to rough turn the flange disk and the hub cap diameter, finish turn at both these points and cut a clearance groove back of the thread for the hub cap. The hubs are next broached for a keyway and then drilled for the bolt circle. The threads for the hub cap are cut on a Lees Bradner thread mill. The thread mill in this case handles about 25 hubs per hr.

The operation on the Dort rear hub is especially interesting from a machine standpoint, although it may be open to criticism from the standpoint of simplicity. The hub has to be formed to a curve as shown by the peak which has been placed on top of the machine shown in Fig. 14. The hub is located in a fixture and is driven from the bolt holes in the flange. An Acme turret lathe with a special set-up roughs and finish forms the hub at the rate of 10 pieces per hr. As will be noted from the chips, this is quite a heavy cut requiring a very rigid tool support.

While the majority of operations on the hub are what would usually be encountered in straight machine work, these few examples will disclose some of the exceptions which are encountered. The manufacture of the wheel itself affords some interesting lessons in pressed steel handling, particularly in view of the fact that the forming is accomplished without putting internal stresses into the metal and at the same time keeping the product up to rigid standard of accuracy. The wheels are held to very close limits of roundness and concentricity. To accomplish this and at the same time to use the tapered construction described has been the object of a process of evolution in the machining of these disks until the methods described herewith have been reached. A few minor improvements are under way in connection with the new wheel which has been added to the line and which has been described in these pages. In the main, however, the manufacturing operations will continue along the lines shown here.

Melting Gray Iron in Electric Furnaces

SINCE 1917 the electric furnace has been used to a slight extent in the melting of cast iron, instead of the usual cupola. At first it was used for melting the iron from cold, but it was soon found that this was uneconomical, a given amount of electrically produced heat costing more than the same amount of heat from coke. It is in the secondary stages of the melting process, the refining and superheating, that the electric process is at its greatest advantage. Handling cast iron, the electric furnace is capable of delivering metal superheated to any desired degree, reduced in sulphur as required, deoxidized, and with carbon, silicon and manganese adjusted to the desired standards.

One of the first concerns in this country to install and use an electric furnace for this purpose was the Lunkenheimer Co., and G. K. Elliott, chief metallurgist of the company, read a paper on the subject of "Cast Iron from the Electric Furnace" before the American Electrochemical Society at Baltimore in April, last. The Lunkenheimer Co. at first used its Herould furnace for melting the iron from the pig, but soon gave this up and since then has been using what is described as the tandem process, in which the iron is melted in the cupola and is then transferred to the electric furnace. According to Mr. Elliott, the electric furnace is at its best when coupled with a chemical laboratory, so that by sampling the molten iron as soon as it is transferred from the cupola, the laboratory can determine as many elements as desired and the proper additions can be made before the metal is poured. The combination of the electric furnace and laboratory can also be made to yield the best possible machining qualities consistent with the physical properties required by the purpose for which the iron is intended.

The most valuable feature of the electric furnace for melting cast iron is that it permits of quickly reducing the amount of the sulphur content. According to Mr. Elliott, in the electric furnace, cast iron with 0.18 per cent of sulphur can be reduced to 0.07 per cent in about 30 min., which is the difference between a relatively bad and a good grade. The percentage of sulphur in the world's scrap pile has a tendency to increase, and this characteristic of the electric furnace therefore should be of great interest to firms located at a distance from sources of good pig iron and which must therefore depend largely on scrap. Just what the sulphur limit in cast iron should be depends undoubtedly on the purpose of the castings, but in one particular instance where large castings are used, they invariably become "dirty" at an important machined point whenever the sulphur exceeds 0.10 per cent.

If iron contains an excess of sulphur, it generally also carries other objectionable impurities which the desulphurizing process tends to remove. These include oxygen in certain combinations, nitrogen in the form of nitrites, and others. The desulphurizing process is one of the most drastic cleansing processes known to metallurgy and an iron that has been subjected to it is generally regarded as a highly refined product.

In the case of iron, superheating is synonymous with increasing the fluidity. The electric furnace gives increased fluidity, which is especially needed where thin section castings are to be poured. Fluidity is a strong assurance of solid castings through freedom from blow holes, shrink holes, slag inclusions, and the like. Superheated metal increases the effectiveness of risers by lengthening the period of fluidity which is their only period of activity as feeders, and thereby obviates to a large degree that internal shrinkage that comes from fluid contraction of the metal. Abetted by super-hot metal the efficiency of the ordinary riser is surprising.

THE North-Eastern Railway Co. of England is at present conducting experiments with motor omnibuses as a means of improving the services on certain branch lines on which circumstances do not permit an extension of traveling facilities of the usual kind. The omnibuses are of the ordinary road type, and are fitted with flanged wheels. As a trial, the first omnibus is being run on the line between York and Strensall.

Buenos Aires Can Buy More Low Priced Cars

Analysis shows that greater sales effort in behalf of low and medium priced cars is needed. Such effort will bring big returns. American motor vehicles now constitute 57 per cent of total.

By George E. Quisenberry*

BUENOS AIRES has not been sold on the American idea of the low priced essential automotive vehicle used for transportation pure and simple. The registrations reveal that most sales have been made on the basis that the motor car is a luxury vehicle for the rich alone.

* * *

American manufacturers have pioneered the rural use of automotive vehicles in Argentina. European manufacturers have scarcely scratched—and probably not even conceived—this other great market. This rural market has been developed under the American belief that an automobile is a general purpose vehicle for use in any and every kind of territory.

AN analysis of the automotive registrations in Buenos Aires, the capital city of Argentina, indicates that the manufacturers of the United States have neglected this expanding market. A few have visioned the existing opportunities and have developed this sales outlet with care and ability, but this is not true in many cases. That there has been little merchandising effort in this greatest city of South America is so readily apparent that it scarcely needs comment; that a field exists for constructive automotive development is likewise apparent.

Buenos Aires is a city of 1,500,000 to 2,000,000 population, the count depending upon which statistical expert makes the calculation. It is the chief city of a country that ranks sixth in the automobile world, being exceeded in total registrations only by the United States, England, Canada, France and Germany. It outranks, according to the world statistics published in AUTOMOTIVE INDUSTRIES several months ago, all countries that do not manufacture automobiles within their own borders, although the contest is close with Australia for this honor.

One-fifth or one-sixth of the automobiles in Argentina are owned in Buenos Aires. A registration list of these city-owned cars and trucks, made up in December of last year, shows a total of 13,755 vehicles divided into 5,871 private cars, 6,230 taxicabs, 1,379 commercial cars (presumably trucks), 173 for which trial licenses have been issued and 102 for which no licenses are required (including official cars). This total is made up of 306 different makes, representing the automotive industries of the United States, England, France, Spain, Italy, Germany and apparently every other country where motor cars are built. It is doubtful if any other city of the world possesses a greater array of different makes (with consequent service problems), but a majority of these, of course, have only one, two, three, four or five cars, imported perhaps direct by the owners or by short-lived dealer establishments. However, comparatively few lines, both American and European, control the market and take, at least in the last few years, all but a small part.

Hundreds and even thousands of European cars bought prior to the war are still being used in Buenos Aires. A very few of the European makers have been able to attempt such merchandising effort there in the last three years and, consequently, the present sales are being controlled by a handful of American and European companies.

The total number of American cars and trucks in Buenos Aires is 7896, or approximately 57 per cent of the total. Of these, 113 are obviously trucks and need not be considered. Ford trucks cannot be taken out of the registrations and, consequently, they are counted as cars in this analysis. The results show:

	Number	Per Cent	No. of Makes
Low priced cars (American)	5594	71	8
Med. priced cars (American)	1688	22	47
High priced cars (American)	501	7	21

This percentage, surprisingly enough, follows closely the percentages established in the United States and, if this were considered alone, it would seem that the Argentine development is proceeding along the same course as here. But such an assumption loses sight of the fact that there are nearly as many more European cars in Buenos Aires, and when they are considered the percentage development appears to be far from normal. An overly high ratio of medium and high priced cars is shown and this in turn means that Buenos Aires has not been sold on the American idea of the low priced essential automotive vehicle used for transportation purely and simply. The registrations in Buenos Aires reveal the obvious statement that most sales have been made on the basis that the motor car is a luxury vehicle for the rich alone.

SIXTY-ONE makes of European cars and trucks have a total registration in Buenos Aires of 6351, each of which, with one possible exception, falls immediately into the high or medium priced field. Europe does not make the low priced passenger car similar to that having a

*Managing Editor, *El Automovil Americano.*

factory list in the United States of $1,000 or under and scarcely any in the class below even $1,500. Most of the European cars are closer to comparable list prices of $2,000 or over.

Unfortunately, it is not possible to ascertain the exact classification for many of the European makes. Some of them have several models in the two classes and it is impossible to distinguish which is which in registration figures. Renault, which has more cars in Buenos Aires than any other make except Ford, formerly built a small taxicab that probably predominates in the 1583 cars of that make. But there can be no doubt of the class of such cars as the Benz, Berliet, Delage, Delahaye, Daimler, Hotchkiss, Hispano, Isotta, Itala, Lancia, Minerva, Napier, Opel, Rochet, Rolls Royce, Vauxhall, Delauney, each in the high priced field and represented by from 24 to 130 cars each. The Bianchi, Clement, Citroen, Chenard, Gregoire, Humber, Martini, Rolland and others are in the medium class. De Dion, Fiat, Durkopp, Renault and Peugeot have models in each class and they cannot readily be determined for comparison purposes. But each of these sixty-one makes is represented by ten or more cars, many of them being in excess of 100.

13,755 Vehicles in Buenos Aires

ALL of the European cars may safely be counted in the upper price classes, except the Renault, concerning which there is some doubt. By deducting all of this make, there are an additional 4768 cars in the medium and high priced fields. A compilation shows:

American medium priced cars	1688
American high priced cars	501
European medium and high priced cars	4768
Total	6957

The total Buenos Aires registration shows 13,755 vehicles and the total of American and European models in these two higher classifications is within a slight fraction of exactly 50 per cent. In the United States, which must serve as an example of the most completely motorized nation and in which the automobile has reached its highest use as a vehicle of transportation, these two price classes represent just 30 per cent of the whole, or less than a third here as compared to more than half in Argentina.

(This computation for the United States is based on the statistical fact that 70 per cent of all cars fall below the $1,000 factory list price, 24 per cent below $2,000, 4 per cent below $3,000 and 2 per cent above $3,000. The difference in the Argentine capital is readily apparent.)

The price class spread would be further enhanced and made more apparent if all other European makes in Buenos Aires were taken into account. These figures were computed on the basis of the sixty-odd Continental makes, each of which is represented by ten or more vehicles. In addition, there are 139 European makes represented by less than ten each, probably totaling some 500 to 750, largely vehicles selling above $1,500 or $2,000, as is customary with automobiles of this type. So many of these cannot be recognized for classification that their inclusion in the statistical picture is difficult.

The number of Fords shown in the registration figures is 4751, or slightly less than one-third of the total vehicles in the city. There is probably no place in the United States where this make is not at least 50 per cent of all cars and trucks and in some places the figure is even higher. The Ford percentage of all American automobiles in Buenos Aires is just under 70 per cent, and it is doubtful if any city of the United States has quite such a large proportion, although this figure might hold true in some country districts.

The preceding paragraph has a double indication. The first is that Ford—and consequently all other of the low priced cars—has not reached its proper percentage in Buenos Aires. The second is that other American car manufacturers have not kept up to the Ford level or, stated differently, other American makers must push sales much farther if they are to keep pace with Ford and with the possibilities indicated by the Ford percentages in the Argentine capital.

Of course it will be granted readily that the city of Buenos Aires is not representative of the Argentine as a whole. Ford has attained a much higher percentage in the smaller cities and rural districts than in the capital, and the gains made by the Ford company in Buenos Aires since the registration figures were compiled last December have been impressive. Furthermore, such American makers as Studebaker, Buick, Hupmobile, Hudson, Essex, Nash, Chevrolet, Overland, etc., show up to better advantage outside of the city. These American makers have pioneered the rural use of automobiles in Argentina as in other sections of the world. The European makers have scarcely scratched—and probably not even conceived—this other great market, four or five times as large as that in Buenos Aires.

Yet it is shown that a small number of American makers have attempted any worthy effort in Argentina. Many American makes, it is true, are owned in this growing country, and in Buenos Aires the registrations show 65 passenger car (many now out of business) and an additional 20 truck lines, or 85 out of a total in excess of 300. But only 33 passenger car and four truck lines have been able to sell more than ten vehicles each. This is a surprising indictment, considering the great wealth of American automobile factories, but the indictment is made more telling by a further study showing the small number of lines now being pushed or which have made any appreciable place for themselves in Buenos Aires. Ten lines represent 1337 out of the 1668 medium priced American cars. Two lines in the higher priced class total 390 out of 501 and four lines represent 5484 out of 5594 in the low priced field. Some of these are not now being pushed and are practically without representation there.

This will be made somewhat clearer by stating the inverse comparison, showing that 37 American medium priced lines have totaled only 331 sales and 19 in the higher priced field are represented by only 111 cars. This indicates the measure of sales efforts made by some makers, who at home pride themselves upon the quality and the intrinsic value of their lines.

To sum up, this analysis shows that Buenos Aires has an unusually large number of fine cars, indicating that further sales effort in behalf of the lower and medium priced lines is needed. Further, it indicates that only a comparatively small number of cars are being actively pushed and that most makers, content with sporadic sales, have made little or no effort to foster trade. From the statistics relating to the higher priced cars, it is readily apparent that much yet remains to be done in promoting the automobile as a transportation vehicle.

Europe Competes

THE very large numbers of European cars were principally brought into Argentina before the war and the shipments from Europe since the armistice have been very small. Knowing what we do about the average life of a car, the industry may well assume that the replacement of these old vehicles should be large. This indicates sales if the attempt will be made to obtain, if only for replacement business and if no new business should develop.

Light Weight Cultivator Designed to Supplement Tractor

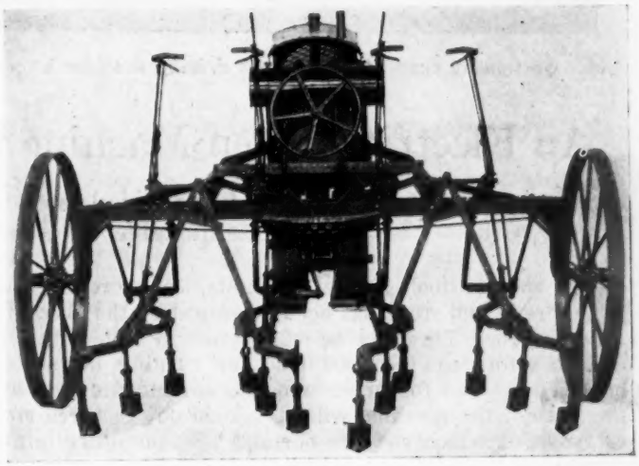
Built to cultivate row crops and do other farm work. Weighs 1200 lb. and has simple design and construction. Transmission consists of bevel gear connection with engine shaft, a vertical shaft and worm gear to axle. To be sold at a low price.

WITH the tractor industry turning its attention to the development of an automotive unit which will cultivate row crops and do other farm work, the cultivator recently brought out by the Boring Tractor Corp. merits attention for the simplicity and uniqueness of its design and construction.

Here is a machine weighing only 1200 lb., and cast iron wheels are to be used instead of those shown in the illustration in order to bring the weight up to this amount. It was designed primarily as a cultivating unit, with the idea of getting a machine which would do the work and still could be manufactured and sold at an attractive price from the farmer's standpoint. It will retail for $395.

The frame is angle iron, the transmission housing and the wheels are cast iron. Power is generated by a four-cylinder LeRoi engine, 3⅛ x 4½ in., which, complete with carbureter and ignition equipment, weighs 350 lb. Perfex radiator, Borg & Beck dry disk clutch, Zenith carbureter, United air cleaner and high tension magneto are used as standard equipment. The wheels are 30 in. in diameter, with 8 in. face.

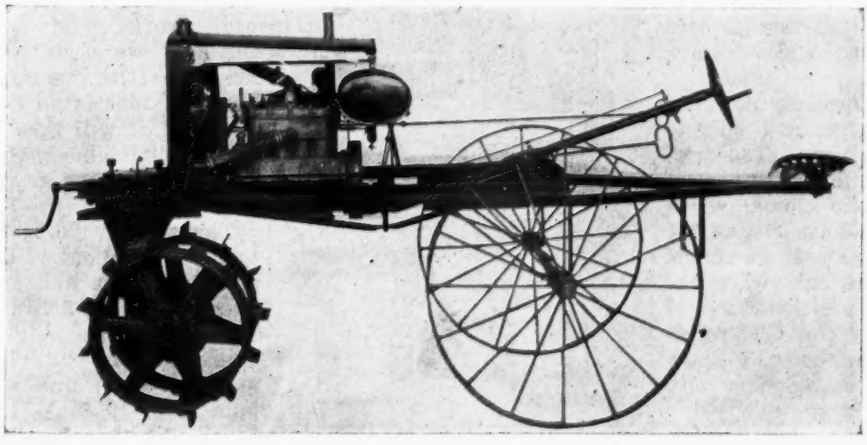
This power unit was designed to be used with the implements now on the farm. In some cases, such as the cultivator shown in the illustration, the attachment can be made direct to the angle iron frame. In other cases a truck is attached to the rear of the tractor and implement connections are made by means of a draw bar. It is claimed that this tractor furnishes sufficient power to operate a two-row cultivator, mower, binder—in fact, any load which can be pulled by three horses. It has not been tried ahead of the plow, but it is claimed that it has



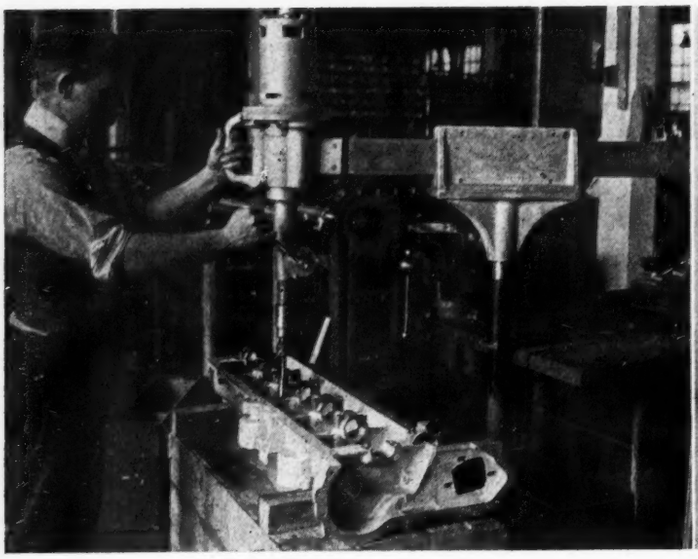
Rear view of Boring cultivator

sufficient power and weight to pull one 14-inch bottom. It is intended to supplement the four-wheeled tractor on the larger farms, and there is hope that it will find a place on the smaller farms.

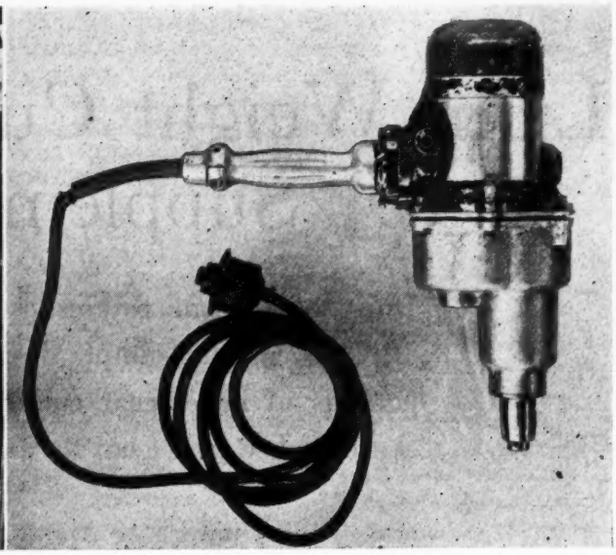
Aside from the general features of the design, which involves two wheels so placed that they will run between two rows of corn, the use of implements now on the farms, and the simplicity of the design, the most interesting feature is the transmission. This consists of a bevel gear connection with the engine shaft, a vertical shaft and a worm gear to the axle. The reduction ratio in the bevel gear is 2.95 to 1 and in the worm gear 20 to 1, giving a reduction from the engine to the axle of 59 to 1. The engine shaft extends across the top of the lower gear in the bevel set. On this engine shaft, but not connected to it, are two smaller bevel gears. A sliding jaw clutch attached to the engine shaft, in addition to the regular clutch, is used to connect the engine with the transmission. When connected with one of the smaller bevel gears the motion is forward, and when connected with the other the outfit backs up. Variation in the rate of travel is obtained by a manually operated throttle control on the engine. The rated speeds are from ¼ to 4 m.p.h. Provision is being made to attach a belt pulley to the engine crankshaft.



Side view of Boring front drive cultivator



Stationary type screw and nut driving machine at work



Portable screw and nut driver

An Electric-Driven Machine for Turning Up Screws and Nuts

Is provided with a multiple disk clutch, adjustable to give desired torque capacity

AN electric tool for setting nuts, cap screws, wood screws and studs has been developed by the Elecdrive Mfg. Co., Inc. The machine will operate in both directions and therefore can be used also for turning down left-handed nuts and for unscrewing right-handed ones. For the present the machine will be turned out in three sizes or types, of which two are portable and the other is stationary.

Patents covering the general principle on which the operation of the machine is based were granted nearly four years ago, and since that time working models have been in service in a well known automobile plant. Many changes have been made in the first crude model, and the manufacturers claim that they have now a machine that is out of the experimental stage.

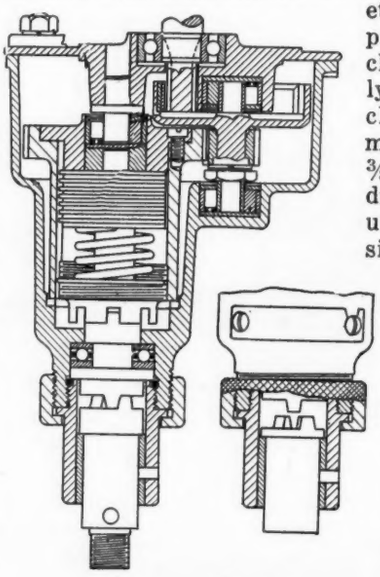
From the accompanying cuts it will be noted that the portable tool resembles an electric drill in its general outline, but that the stationary type is a radical departure from any machine heretofore made for this purpose. The portable tool operates from an electric light socket on either a direct or an alternating current circuit of 110 volts, with a frequency not exceeding 60 in the case of alternating currents. The stationary type should be connected to a power line, though where the wiring installation involves a large factor of safety it may be operated also from a light socket. This type also forms a universal motor.

The tools are provided with motors specially designed for the purpose, of the high speed type, and operate through a reduction gear with a 10 to 1 ratio. The driving mechanism, which forms the patented feature of the tool, consists of a multiple disk slip clutch, which can be adjusted for any torque within the capacity of the motor, driving through a splined shaft to a positive clutch. This positive clutch automatically "kicks out" when the disk clutch is fully released. While the positive clutch is disengaged the driving spindle is entirely free. This feature permits the removal of the wrench, chuck or screw driver from the driven member and its engagement with a new member while the motor is running at full speed.

It is claimed that the slip clutch insures that all nuts or screws are driven to the same tension and that it prevents shocks to the motor. This clutch is so designed that it cannot be over-tightened, and thus cannot overload and burn out the motor.

A special feature of the Elecdrive machine is that it provides for slow setting up of the nuts or screws, obviating the possibility of stripping threads, straining bolts and injuring the tool. Both the portable and stationary tools are furnished with recessed and tapered wrenches, so that nuts can be picked from the bench while the tool is running at full speed. The nut or screw is held in the wrench so its axis is true with the driving spindle of the machine and can be started without danger of cross threading.

During the period the screw or nut is being driven down the driving spindle of the machine rotates at 1000 r.p.m., but during the actual setting of the nut or screw the spindle is slowed down to about 350 r.p.m. The stationary type of machine can be equipped with a hopper which will handle double chamfered nuts, cap screws, wood screws, etc. With the hopper the performance of the machine is said to be greatly increased, and it is claimed that in experimental work thirty-two ⅜-in. nuts were started, driven and set in one minute. Each tool is so designed that it will take a Jacobs drill chuck and can then be used as an electric drill.



Section of Elecdrive

The smaller portable tool weighs about 11 lb. and will drive and set nuts from ⅛ to 5/16 in. The larger one weighs approximately 13 lb. and will drive and set nuts from ⅛ to ½ in. Stationary type handles ½ to 1 in. nuts.

Get a Good Foreign Dealer—Then Take His Word as to Sales Prospects

American automotive business in foreign countries depends upon the quality of dealer connections established and maintained. Well established agents know their market rather well. Permanent business can best be developed by co-operating with them.

By M. H. Hoepli*

A CONTRACT or agreement in which a dealer takes upon himself the obligation of disposing of a certain number of a manufacturer's cars, is an instrument serving as a guide to both parties concerned: For the manufacturer it represents a basis for future production; for the dealer it serves as a norm by which he gages his sales efforts. By its very nature the agreement should thus result in benefit to both of the contracting parties; if it works to the detriment of one of them, the agreement is faulty.

Years of extreme commercial fluctuations, such as 1918-1919 on one hand and 1920-1921 on the other hand, are likely to witness a maximum of unsound contracts and their detrimental results. In 1918 and 1919 the dealers in American cars could sell all the cars they were able to obtain from the manufacturers and in order to obtain a certain number of cars they became used to asking for a multiple of this number. Consequently, sales estimates were exaggerated and sales agreements "inflated." In 1920 and 1921, the years of deflation and depression, the manufacturers, in order to deplete their inventories, held dealers to their contracts, with a result that most of the latter suffered considerable financial hardship and many of them went into bankruptcy.

In 1922 the consequences of the past four years' experience make themselves felt. The dealers who were chiefly responsible for the overestimates and unsound contracts, are placing conservative estimates. However, the results of the most rapid improvement in the home market already reflects itself in the attitude of the American manufacturer. The reasonable, in many instances, perhaps, overpessimistic estimates of the foreign representatives are severely criticized and frequently burdensome contracts are forced upon them—even at the risk of losing well-established dealers, or at least their good-will.

Several such instances have lately come to the attention of the Automotive Division. In one case, which may serve as an illustration, an American manufacturer, who was about to introduce his new medium-priced car in a market, went as far as requesting that a very successful dealer of highest standing, and with an excellent sales and service organization back of him, pledge himself to sell a number of cars over twice as big as the highest mark ever reached by a well-established competitive car of the same class. The situation is the more noteworthy as in the face of most favorable offers from European manufacturers, this dealer has remained singularly faithful to American motor cars and tires. While thus the undoubtedly most desirable dealer refused to be forced into a contract to which he could not whole-heartedly subscribe, the manufacturer prided himself with having had a number of solicitations for the agency of this car from parties which were willing to meet his conditions. A careful investigation on the part of the local representative of the United States Department of Commerce, who is highly regarded by the automotive industry, showed that these offers came from parties that had either no standing whatever, or no previous experience, or no capital to back them up, or no selling and servicing organization. What would the results have been had the agency of the American car been accorded to one of these promising prospective dealers?

The lesson is plain: The past record of a dealer is more important for future business than promising estimates. If a dealer has been successful in the past, his suggestions should be followed, although they may seem overconservative, as he knows his territory better than the manufacturers.

THE staff of the Automotive Division of the Bureau of Foreign and Domestic Commerce has a chance to observe closely the foreign merchandising method of American automotive manufacturers.

In this brief article, M. H. Hoepli, Assistant Chief of the Automotive Division, tells what he thinks about foreign dealer contracts. To illustrate his idea, he cites an interesting incident which occurred recently in connection with the foreign selling activities of a prominent car maker.

AS a result of motor car price reductions of about 25 per cent, the number of high-priced cars around Campbellton, New Brunswick, has increased. At present there are 12 makes of cars represented as compared to 4 a few years ago. Approximately 5000 passenger cars and 600 trucks have already been registered this year in comparison with 12,585 cars and 875 trucks during 1921.

*Assistant chief, Automotive Division, Bureau of Foreign and Domestic Commerce.

Motor Buses and the Electric Railway

The bus can help the electric railway. Akron, Ft. Worth, Niagara Falls, and many other cities furnish examples of practical co-ordination. Interests of steam and electric roads as well as those of the consumer are best served by low motor vehicle taxation.

By Zenas W. Carter*

THE question of the economy of motor trucks and motor buses when used by electric railway companies has too many factors for anyone to offer much more than a statement of some of the operations already under way. For instance, six months ago an officer of one of the Ohio electric railway companies made the statement that they were not interested in motor buses. At the present time the same company has determined that it will be economical for them to purchase, and their order has been placed for five special motor buses. These are to be operated on a highway paralleling their present lines.

Their decision was made from two angles entirely uninfluenced by the question of direct profit. In the first place, if they had not initiated bus operation covering the territory, someone else would have started this service. Their franchise was in jeopardy because the public in the territory were not adequately served by the present electric service. Another factor was lack of capital to make the electric extensions, and their belief that the cost of additional track laying and equipment would be too great to prove a profitable investment at the established rate of fare.

Another company, the Northern Ohio Traction Co. of Akron, found by careful study and survey that there was an opportunity to keep competition from their electric lines and at the same time operate buses at a profit by initiating two bus lines, generally paralleling their trolley service at a distance of several blocks off track. On one of these lines there was already partial jitney competition, but this competition will soon be entirely eliminated by the action of the trolley company in purchasing high class motor bus equipment and by their granting transfers from bus lines to the trolley cars.

An important factor in both these cases is also the opportunity offered by motor bus use to test the volume of traffic which may be secured in advance of making an expensive installation. Furthermore, should it be necessary later to either abandon the lines or prove more profitable to install electric trolley operation, the motor buses will have a large salvage value or may be at once transferred to other service.

THESE two cases are cited, particularly, to illustrate that the question of economics in electric railway operation is not necessarily a question of making a specific profit on a definite installation of motor equipment.

On the other hand, there are hundreds of motor bus lines in operation in the United States in territory which was not being served by either the electric or steam companies. These hundreds of bus lines are delivering a profit to their operators. In some cases, as in California and a few of the Middle West cities, the patronage has already proven so profitable that passenger and transfer stations have been supplied by the bus operators.

It is reasonable to assume that this business belonged to the transportation companies, either the steam or electric operators. As it is in outside hands, it is evident this transportation business was lost to the regular transportation companies largely through lack of interest in their making surveys for motor bus operation.

Several of the larger electric and steam railway companies have, however, checked over their prospective fields and are now actively in the business of catering to the public idea that they desire to "ride on rubber."

At Milwaukee, the Milwaukee Electric Street Railway Co. made surveys which have justified their purchasing and operating twenty or more buses in co-ordination with their electric service.

AMONG the many street railway companies in the United States who have initiated bus service in co-ordination with their electric property operations are the United Electric Railways Co. of Providence, R. I.; the Pennsylvania and Ohio Electric Railway Co. of Youngstown, Ohio; the Rockford and Interurban Street Railway Co., Rockford, Ill.; the Connecticut Co., at various places in Conford, Ill.; the Public Service Corporation of Newark, N. J.; the street railway companies of Baltimore, Washington, D. C., and Tulsa, Okla.

Several of the New England companies have already initiated bus service, and in California the electric lines are both operating buses as individual companies and in co-operation and in co-ordination with independent bus companies in order to issue through tickets for long trips. At Niagara Falls, the Gorge Railroad Co. supplement their service by a bus operation; the Escanaba (Michigan) Power and Traction Co., and the Northern Texas Traction Co. of Ft. Worth are also now on the list of users of both electric and gas motor bus transportation. At San Francisco and Seattle the municipal companies are co-ordinating both types of service in carrying passengers. As an evidence of the very rapid increase in the use of motor buses throughout the United States and in support of the statement that the public are enthused over the flexibility, convenience, economy and utility of the motor bus, it is most interesting to cite the fact that one manufacturer of buses has received orders for over 350 of a new model which was first announced to the electric railway and motor bus operators on Jan. 1, 1922.

As transportation men, the electric railway operators will undoubtedly be much interested and possibly quite surprised to know that an independent bus operator,

*The White Co. *Excerpts from paper read before Central Electric Railway Association.*

Frank Martz of Plymouth, Pa., carried more passengers per bus in 23 buses which he operated in Wilkes-Barre, Pa., in 1921 than were carried by the same number (23) of the buses operating on the Fifth Avenue Line in New York City. The figures are: For Wilkes-Barre, 183,891 passengers per bus; for New York City, 174,192 passengers per bus. In fact, the total passengers carried by Mr. Martz in the buses which he operates in Wilkes-Barre, Pa., territory was well in excess of 4,000,000 passengers carried during 1921. Mr. Martz began hauling passengers in and about Plymouth, Pa., in 1910, and he reports that several of his buses have passed the 300,000 mile travel mark, that 8 have run more than 200,000 miles and that 20 of them have run more than 100,000 miles each.

Throughout the United States there are dozens of these independent bus operating companies, which have had a period of existence amply justifying the statement that motor bus operation is an economic transportation.

Mention should also be made of the rapidly increasing use of motor buses of special type to transport vacationists, tourists and business men into scenic and resort territory previously inaccessible on account of the expense of establishing either electric or steam transportation on account of physical contours of the country and the seasonal feature of the traffic.

With almost 11,000,000 motor vehicles already on our highways, it will be just a short time until all individual highway transport will be by motor.

This is the logical step for this generation. It is the absolutely necessary step in the evolution of mankind. The steam railways and the electric railways will reap a return ultimately from this motorization, as it will tend to knit still more closely the country into a corporate economic unit, promoting and facilitating quick exchange and rapid interchange.

While at the present moment, in some isolated instances, the advent of the motor truck and the motor bus may seem to initiate a new competitive unit and ultimately there may be numbers of lines of steam, electric and motor buses serving in the same community—the motorized vehicle will always be used for a type of economic transportation which, in general, is not competitive with either steam or electric operation.

IT is an important fact that the motor on the highway offers the opportunity to supply the public with both local and express service operating over the same route, while this is impossible on single line rail.

It is very probable that a great many electric railway companies could profitably operate bus lines paralleling their rails, especially in congested centers, operating the bus lines for express service and using the electric service almost entirely for local stops. In many cities it would be possible to secure 10-cent fare rates for such improvement in service, and thus turn into a very profitable operation a franchise which carried so much long haul traffic as to be otherwise unprofitable at the usual 5-cent fare rate.

In other cases such a service might solve a rush hour congestion problem profitably where the addition of extra cars would only tend to slow up movement and increase congestion.

ANOTHER field for the use of buses in conjunction with electric line operation is in territory where development has spread the area served until a large percentage of possible short haul passenger business is lost on account of the distance the passenger must initially walk to reach the trolley.

The use of buses covering such a section over what might be called a curved or bow route paralleling the trolley service at some distance but not operating on exact trolley schedule would often prove distinctly profitable and preserve the existing company from possible competition.

The picking up and delivery at curb, whether in urban or in congested city territory is a psychological element to consider in the opportunity to increase short haul traffic.

While the motor vehicle automatically demands good roads and the use of motor vehicles increases in proportion to the improvement in the mileage of good roads, the all-important point is that the mass citizenship is bettered by the improvement of roads, as it is an old adage that civilization and development follow improvement of transportation facilities.

Even the interests of the steam and electric roads may ultimately be served better by low taxation of motor vehicles than by high taxation. The steel rail carriers, both steam and electric, are the transportation industry. Sooner or later they will own and operate their own motor truck and motor bus lines, probably using trucks very extensively in store door delivery, which is beginning to be demanded by merchants and wholesalers; and motor buses for the economic handling of their short haul and local passenger business and to supplement and probably in many congested districts to support or supplant already established lines.

In fact, as there are now dozens of electric railway and steam railway companies who own and operate both motor trucks and buses, they are just as much interested and will be more interested in the future in keeping down the taxation on motor vehicles as will the makers of motor equipment.

For this reason, it seems fitting that all transportation interests—the electric railway and steam interests as well as the motor interests—can well refrain from agitating for taxation which may ultimately tend to become a boomerang tax, and thus prove burdensome to their own operations. Especially is highway tax agitation futile when it merely tends to widen the transportation cost breach existing between consumer and producer, and as well to reduce the volume of goods which may be transported by motor for short haul, and thus increases the unprofitable short haul tonnage to be handled by the railways.

THE interests of the steam and electric roads may ultimately be served better by low taxation of motor vehicles than by high taxation. The steel rail carriers, Mr. Carter states, will sooner or later own and operate their own motor truck and motor bus lines.

It seems fitting that all transportation interests refrain from agitating for taxation which may ultimately tend to become a boomerang tax, and thus prove burdensome to their own operations.

Highway tax agitation is futile when it merely tends to widen the transportation cost breach existing between producer and consumer, as well as to reduce the volume of goods which may be transported by motor for short haul and thus increase unprofitable short haul tonnage for the railways.

Turn the Spotlight on Your Mass Selling Methods

Mass selling is to modern merchandising what machine tools are to modern production. Present marketing is speculation in future buying habits. Advertising should be subjected to the same critical analysis by factory sales manager as individual selling.

By Harry Tipper

THE automotive manufacturer must use all the methods of sales promotion, sales development and maintenance which are available to modern marketing without any waste and without any lack of co-ordination in the objects and the development. There are a number of differences in the methods employed by different concerns. This is highly desirable. But the differences are in the details of the operations, rather than in the broad classification of methods. These remain practically constant through all the operations of marketing in all lines of business.

Practically all of these usages can be arranged under two headings:

(1) Those which are devoted to the individual work of marketing.

(2) Those which are given over to the mass work of marketing.

HARRY TIPPER tells in this article:

* * *

1. What advertising should be expected to do.

* * *

2. Why it doesn't always do it.

* * *

3. How to make it do what you want it to.

The progress in production methods has been from the exclusive use of hand methods and implements to the increasing use of mass methods, or machine operations wherever these methods have proved their advantage for the particular operations and objects. Gradually the machinery was increased so that there are few purely hand jobs in a modern factory. This has not lessened the value of the man but has multiplied his capacity to produce.

Something of the kind has been happening in the commercial side of business, particularly in connection with marketing. At one time the entire transaction of marketing was a personal one and the whole development of the sale an arrangement between persons. Even the correspondence was individual and hand written and used only between known traders on specific transactions. Gradually the necessity for building up markets against a future sale demanded the mass attack on the market as a whole, with no specific transaction or individual in view. More and more the future market alone could meet the necessities of the plant and its investment. The speculative character of business, the storing up of wealth in production facilities, which were valuable only as they remained employed in turning out useful product, demanded that a market be built up which would endure beyond the range of the founders and the active time of the capitalists. Plants were erected and started on capital borrowed from contemporaries. These plants could not pay back the amount of the borrowings unless uninterrupted business for many years should make the regular amortization possible. Bonds have been issued which required ninety years to mature, leases have been taken for ninety years, other transactions frequent in the world of business show that the modern business man is obliged to speculate on the buying habits of future buyers, with unknown ideas and with unknown desires.

This development more than anything is responsible for the increasing use of mass methods in promoting and maintaining the market for the products of the manufacturer. The individual or hand method of selling and marketing was too uncertain in its development and its future to fully insure the promoter and capitalist who desired to build up a business with the mass machinery of manufacture and keep that business on a thoroughly stable foundation.

It did not provide for any building up of a future market which would be ready to receive the products years after the first transaction had been consummated.

It was, like the hand method of manufacture, clumsy, cumbersome and slow, capable of wonderful work, but lacking the speed and volume necessary to insure the covering necessary as a corrollary to the mass manufacture.

After the Civil War these mass methods of promoting the market began to assume a regular place in the life of American business, and they were adopted with greater rapidity after the pressure of competition became more severe as the manufacturing capacity began to approach the market desire to consume. They grew up from two different possibilities—the advent of the typewriter, which permitted the extension of correspondence and the growth of printing and publications which offered opportunities to the manufacturer for securing public attention to his products and organization.

These mass operations were undertaken usually without any great definition of policy and they have remained without thorough definition in most business institutions.

This is most clearly shown in the way in which the

methods and objects of these mass selling methods are decided. The average concern adopts a selling policy only after some careful consideration of the responsible heads and the development of the selling force—that is, the force of salesmen, branch offices and executive system for sales is the subject of very definite consideration and consultation. The erection of a branch house, the development of a sales territory and the extension of a sales force are matters to be given a careful analysis, and the collection of thorough information in all directions. The executive who is responsible for the sales force and its work is rightly considered as an important executive and his responsibility and authority are in accordance therewith.

MASS methods of selling, on the other hand, loosely classified under the head of advertising, are decided with comparatively little analysis in comparison. It is not unusual for a manufacturing concern to take the plans of an outside organization and empower such an organization to run the matter without any special check or analytical comparison. The executives who are in charge of the operations of mass selling do not receive either the responsibility or the authority which should be accorded to the men superintending such important operations.

This is largely because the work of mass selling, having been classified as advertising, has not been put entirely and thoroughly under the marketing work of the organization, the general principles governing the use of these methods have not been understood by the business man, and the whole development has been left too largely to the men who were specialized in the work of advertising as a separate and different character of business medicine which had little relation to the other operations, except the rather curious way in which its intangible impressions resulted in business improvements and extension.

MASS selling through advertising seldom receives the same careful analysis or check up that is used in preparing and following up the individual sales campaign. This has naturally resulted in much waste which is avoidable to the same extent that other wasted sales effort is avoidable. Similar methods and care can and should be applied in both individual and mass selling, and the two should be fully coordinated.

This has been the cause of most of the misuse of the mass selling methods and the large amount of waste connected with the general development of this branch of the marketing work. It should be thoroughly understood that advertising is mass selling; that it is a part of the sales work which is subject to the same developments as the individual selling, the principles governing the proper growth of the individual sales force are the same as those which should govern the advertising or mass selling operations. To accomplish this thoroughly and to coordinate all the methods of marketing the executives in charge of the marketing work should be versed in all methods of promoting and maintaining the market. All methods and special development should grow out of the full general plan of marketing, each method being associated with the same object. The first and most essential object of marketing is to secure and maintain customers sufficient to take the output of the factory at proper terms and to increase these customers as rapidly as the possibilities of manufacturing extension will permit. For this purpose it is necessary to know the location and industrial grouping of the present and prospective customers, or their relation in connection with social groupings and the general population.

In the automotive field it is comparatively easy to get this knowledge because of the public information contained in the statistics of registration and the previous records of the individual concern. When this knowledge is secured, the sales organization and the branch offices must be placed so that all these customers can be covered from the proper centers of activity, which will permit of this work being done at the least cost. The number of prospective customers and the required frequency of calls will regulate the size of the sales organization required for a given problem, while the economic relation of the territories to the cost of movement over them and their productivity will determine the number and location of the branch establishments necessary.

The first job of the advertising, or mass selling, is to parallel this work of the sales organization, doing in the mass much of the work of promotion which would have to be done otherwise by the slower and more expensive means of individual salesmen alone.

In addition to paralleling the work of the sales force the mass selling, or advertising, should also be used for the promotion of the business among prospective customers in territories not covered by the sales force, so that many of the areas to be covered in the future will be more readily worked by the salesmen as the business extends itself and with less original investment in securing the market therefrom.

In many lines of business, and in this the automotive field is no exception, customers and prospective customers vary greatly in their purchasing capacity through a given period. The sales pressure, both from the sales force and the mass selling, should be graduated as much as possible to the purchasing possibilities, so that few sales are made at a cost exceeding the economic limit desirable for profitable operations. In this respect the mass selling can be used to supplement the work of the sales force among the customers very effectively because of its ability to reach the attention of the prospective customer with little cost many times, where the salesman is restricted to a very few because of the limitations imposed by the necessities.

It is not good business policy to put the same pressure of individual and mass selling on a customer who can buy a few hundred dollars worth of goods in a year as it is to put it on the concern which will buy many thousand. Both are desirable, but the competition and the economic limits of cost both demand that the latter shall receive more attention and more careful effort in the endeavor to secure his business.

IN addition to paralleling the work of the sales force, the work of mass selling may be extended profitably beyond the area of the present and prospective customers, so that it may work upon other market influences. It is in this extended work that much of the controversy has arisen and many of the values have been diminished, so that large expenditures have been wasted. As this work is the subject of much argument and is governed by such intangible laws, it will be necessary to give the discussion of it a larger place than the present article would allow, so that a further article will be devoted thereto in an early issue.

It is advisable to determine the work of mass selling from the basis that all advertising work is an attempt to sell in the mass, and it is subject to the same fundamental and practical considerations as the development of individual selling.

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Truth in Advertising

THE Vigilance Committee of the Associated Advertising Clubs of the World has just issued a pamphlet detailing its activities in the automotive field during the past year. The cases given attention range all the way from the so-called "unqualified" guarantee used by a few battery manufacturers to false claims in the promotion of new automobile concerns.

The Vigilance Committee is a constructive, hard-working organization whose activities are for the best interests of the industry as a whole. By helping to eliminate false claims and untrue statements in advertising, it aids the constructive efforts of the legitimate manufacturer and advertiser.

All sound and permanently useful advertising is based upon truth. No executive in the industry would dispute that fact. Yet many statements are made in car and truck advertising which, while perhaps based on truth, are not readily traced to their source. Exaggerated terms such as "finest," "best," "most beautiful," etc., are not subject probably to any active criticism by the "Truth-in-Advertising" campaigners, yet they are certainly steps in the same general direction as statements which make false claims for a product.

The vast majority of publicity material sent out by automotive concerns is still bombastic, prejudiced and exaggerated. Its effectiveness is thereby materially decreased. The public becomes more "motor-wise" each year. And the selling value of superlatives decreases accordingly. Sound thinking in advertising and publicity will help greatly to reduce marketing costs.

Crane's Spring Suspension

MOST of the improvements in connection with chassis springs which have been announced within the past several years have had for their object either to vary the flexibility of the springs with change in load, making them stiffer as the load increases, or else to eliminate the spring shackles with their bolts and the wear and tendency to become rattly, which are associated with these parts. The new spring suspension system described by H. M. Crane in his S. A. E. paper presented at the White Sulphur Springs meeting aims at somewhat different objects, namely, to combine the good points of the Hotchkiss drive and of the system embodying the use of a torque tube or torque arm.

The advantage of the Hotchkiss drive is that it cushions the drive and protects the transmission members and engine from shock. This is generally appreciated. There is one questionable feature connected with the Hotchkiss drive, however, which has been the reason why a good many engineers have refused to consider its adoption, and that is the effect of extreme torques on the springs, whether these torques be due to driving or braking. To enable the springs to withstand extreme torque couples, modifications are usually made in its design which adversely affect its ability to absorb road shocks. A moderate cushioning effect of the springs under a sudden variation in torque is certainly very desirable, but to keep this cushioning action within reasonable limits the spring must be made comparatively stiff, which interferes with its principal object, that of cushioning road shocks.

Mr. Crane therefore has produced what amounts virtually to a combination of the Hotchkiss and torque arm drive. With this suspension the rear axle housing has a certain angular flexibility, but the range of its angular motion is limited by the radius rods between short arms extending downward from the axle housing and the side members of the frame. Shocks in the drive are therefore relieved and at the same time the springs are protected against excessive strains due to torque reaction. Consequently it is not necessary to specially stiffen the springs, and their ability to absorb road shocks is not impaired.

One advantage of the Hotchkiss drive, that of simplicity and low cost of construction, is not realized in the new design, at least not to the same degree, but as the latter is probably intended for high class cars only, this is a matter of no great moment.

What Next?

COMMENTING upon the miners' strike recently, the *New York Times* said that the miners were not interested in having their leaders become powerful and prominent but only in the final result of "obtaining steady work at a living wage."

The remark is worth attention, because it is somewhat typical of the mistaken attitude frequently assumed by employers as regards the needs of employees. "Steady work at a living wage" is certainly a desirable thing in life—one of the necessities. Yet the employer who deludes himself with the idea that workers will be satisfied when this end has been achieved is neglecting to recognize many important aspects of human reaction.

"Steady work at a living wage" provides only the basis for a happy life. The individual spirit or ego or Whateveryouwanttocallit is constantly striving for greater development; for more opportunity for achievement; for more worlds to conquer. Complete industrial stability rests upon a recognition of this fundamental human characteristic. When means have been found to so organize industry that those who work can have complete opportunity for personal development, friction between employer and employee will be materially reduced.

Progress has already been made. Many employers, recognizing this desire for development in themselves, have rightly assumed it to be common to most men—to all men likely to be of constructive value to an organization. These employers have been seeking the means of industrial readjustment. They have made some progress but are still studying and experimenting. The automotive industry has a big part to play in carrying forward such investigations and analyses.

How To Sell Buses

WE had lunch the other day with one of the men who has done most for the promotion of bus transportation in its commercial aspect and who has been prominent in advocating that the automotive industry build the buses. We asked him how he would go about selling buses to-morrow if the job were put up to him.

He said something like this:

"I would organize a factory selling organization, separate from my regular truck dealer organization. This factory selling force I would operate much as the big truck companies do their men selling to big national truck users.

"The dealer organization could be worked in to give tips and leads, but the central sales force would be equipped, capable and expected to sell the buses.

"I would try to sell to the electric railway lines now in existence. They are the groups which have already at their command sufficient capital and sufficient transportation experience to buy, equip and operate bus lines immediately. The bus will develop as an ally, not as an enemy of these interests. Existing transportation agencies are the largest immediately available bus market.

"It would be more difficult to sell to individual bus operators in various parts of the country, although my central selling force would attempt this in the case of those bus lines known to be in existence. Dealers might help out in giving tips about local bus propositions before the equipment had actually been bought.

"Further experience in selling buses will develop better and more efficient methods than those I have outlined. But this is what I would do if asked to outline a plan for immediate use."

Here is one interesting answer to the question that is before most of the companies which have taken up bus development work. Bus marketing must grow along with better bus design.

Stiffer Frames Needed

THERE seems to be little doubt that the average passenger car is fitted with a frame which is much too flexible to resist torsional and other stresses to which it is frequently subjected without subjecting the body and other parts to strains which shorten their life and result in many unpleasant rattles which might otherwise be avoided.

The frames of modern cars seldom break unless grossly mistreated, but they do distort and in so doing often cause excessive distortion of the body as well as other members more or less rigidly attached to the frame. The resultant weaving, especially of closed bodies, opens up body joints, causes doors to bind and sometimes even become inoperative. It results also in other troubles which are, to say the least, extremely annoying to the user though he may not realize their cause.

Some concerns have redesigned car frames with a view to overcoming trouble of the kind mentioned and certain patented constructions have been employed in other instances. In one case the running boards are made integral with the frame, which is of very deep section, and in another a heavy gage tubular member, which serves also as a muffler, is riveted between two transverse members and it gives the frame an unusual degree of torsional strength about a fore and aft axis. Both of these constructions are steps in the right direction and one at least may be presumed to add but little to production costs, since it is to be used in a low priced chassis soon to be produced in very large quantities.

There are doubtless many other ways of building less flexible frames than are now used. In any case the matter is worthy of much further study and experiment and should handsomely repay those who give it the consideration it deserves.

Total June Output Reached 271,000

New Record Exceeds May Mark by 15,000

Production for Quarter, 746,000, and for Six Months Approximately 1,138,000

By JAMES DALTON

NEW YORK, July 12—Another new record for production of passenger cars and trucks was established by the automotive industry in June with a total of 271,000. This exceeds by 15,000 the May record of 256,000. This would make a total for the second quarter of 746,000 and for the first half year of approximately 1,138,000. The total for 1921 was 1,668,000. The gain over June, 1921, was 51 per cent.

While factory schedules for July have not been cut materially, there will be a considerable falling off in the month's production because of the universal July 4th holiday and inventory taking in several plants. The total will reach large proportions, however, and probably will approach 200,000. Ford expects to make as many vehicles as in June and the same is true of some of the other companies.

A seasonal falling off in sales has become apparent in some sections, notably in the larger centers of population. The farm demand has not really opened and the extent of the decline will depend in large measure upon the volume of sales in the agricultural districts.

Truck Makers on Alert

Truck makers are watching the rural districts even more closely than the passenger car makers. Most of them are bringing out new models of light trucks designed especially for farm use and will cultivate this field intensively. Unless there is a strong demand in this direction it is not expected that truck business will go much beyond the present level for the remainder of the year and it may fall off.

Passenger car manufacturers are confident that sales of closed cars after August will be unprecedentedly large and will make the volume of business for the closing months of the year entirely satisfactory. Many

(*Continued on page* 95)

Business in Brief

NEW YORK, July 10—Potential danger of serious interference with freight traffic is found in the strike of the railroad shop craft workers in its second week. Several of the roads are annulling trains, and considerable congestion is reported, although conditions cannot be described as serious up to this time.

Administration efforts to settle the coal strike give some promise of success. Unless work is resumed soon, conditions in certain sections of the country next winter, particularly in the Northwest, will be serious. When production of coal is resumed, its movement in large quantities by the railroads may interfere considerably with other traffic.

Labor troubles are the only clouds on the industrial horizon, but with nearly 1,500,000 workers in voluntary idleness, they cannot fail to have their effect sooner or later.

Manufacturing and industry generally have maintained their activity, and unemployment, except that which is voluntary, is negligible.

There has been a noticeable improvement in crops, especially corn and cotton, in spite of irregular weather conditions.

Retail trade slowed down somewhat after the pre-holiday rush, but jobbers and wholesalers are receiving more small lot orders for near and distant delivery.

The steel industry is most strongly situated, both as to output and prices, but the rising cost of fuel and labor is eating up the price additions. Operations are restrained by the necessity of hoarding coal and coke.

Building reports for June in large cities indicate that new records were established in that month.

Rising prices for raw materials and finished products have made for uncertainty in the textile markets.

No softening of prices is apparent in the wool markets.

Railroad stocks are buoyant, bonds active and higher, sterling up and other European exchanges weak.

Bank clearings for the week ending July 6 were $6,803,504,000, a loss of 1.5 per cent, as compared with the previous week, but a gain of 11.4 per cent over the same week in 1921.

Lincoln Car Changed and Price Increased

Town Model Now $7,200—Revisions in Any Other Types Will Be Upward

DETROIT, July 10—Forty-four aluminum parts for the Lincoln car are now being cast in the River Rouge foundries of the Ford Motor Co., in addition to the casting of the cylinder blocks and crankcases. Machining is continued at the Lincoln Motor Co. plant. Additional equipment is being added at the Rouge to permit handling castings for the entire Lincoln output.

Without formal announcement the town car of the Lincoln line has been remodeled and the price increased from $4,800 to $7,200. Previous to the sale of the plant to Ford in February the town car had been $6,000. The new town car is understood to represent an Edsel Ford idea in fine car construction, the body work being of an exceptionally fine type.

Formal Statement Expected

Since the severance of relations between the Fords and Lelands, there have been no formal statements by either side, but a statement by Edsel Ford on Lincoln manufacturing policies is expected soon to be made. This statement will show, it is reported, that the Fords are undertaking to manufacture America's finest car, that the production will be on a limited basis and that prices, if changed at all, will be increased to compensate for the extra fine character of the general construction.

Changes in prices made by Ford since taking over the Lincoln have been increases, the new prices being practically higher than formerly. In both revisions to date the construction of the car has undergone important changes, the improvement being principally in the bodies. Apparently the thought of competition has not been allowed to enter into the manufacturing plans, as the sole idea has been to make a very high type of car regardless of price.

Sales Running High

Sales of Lincoln cars are reported to be running high, and orders are said to be four months ahead of production. Output at the factory is ranging from 30 to 35 cars daily. A constant flow of orders is reported to be coming in despite the long wait for deliveries. Sales are being handled through the Ford sales office, of which R. C. Getzinger, who was formerly Lincoln sales manager, is now a member.

Makers Keeping to June Schedules

Dealers Hold Orders Down to Sales Basis

Demand Reported Steady with Decline from Rush of Early Spring

DETROIT, July 10—Reports received from factories in the Detroit district indicate that a compilation of figures on June production will show a slight increase over the record output of May. In most factories the variations were very slight due to the fact that capacity was reached in May, but better deliveries of materials and other causes enabled the June production to run just a trifle higher.

Production in July so far as the daily schedules are concerned will be practically identical with the schedules of May and June but holidays early in the month and close-downs for inventory and vacation periods, will bring the monthly total considerably lower. The demand for cars is reported to be steady but falling off from the early spring rush. Dealers are said to be holding orders strictly to a sales basis.

Program of Companies

Columbia Motors, with the assurance of deliveries of materials for its light six, has set a schedule of 1650 cars for July, which will exceed its June total by 100 per cent. Two-thirds of this will be the light six and the remainder the former larger models. Gray Motors has booked a total of 500 cars for July, which will be its first full production month. First deliveries of the Gray were made late in June and consisted mainly of demonstration cars for dealers.

Incomplete figures for Ford business in June show that the schedule of 130,000 cars and trucks and 10,000 tractors was approximated. The company has set a similar schedule for July production and announces that this schedule is lower than the orders received from its dealers. There will be considerable orders carried over into August, for the most part these being in the closed models.

Dodge production is continuing at the rate of 550 to 600 daily and Maxwell at the rate of 300 to 350. In the latter case the month's total will be lower owing to a week's closing for inventory in the first part of the month. Durant production is continuing at the rate of 100 daily, June being the largest month to date for the Lansing plant and increases are set for July and August. Production of the Star car will begin at the Lansing plant in August. Dort Motor production for June was lower than in May. The July schedule is fixed at from 50 to 70 cars daily.

Hudson Motor Car Co. reports an increase over its May total of about 5 per cent in June, and expects to approximate the June production in July. In both the Hudson and Essex models the daily production is continuing at 275 to 300. Hupp Motor Car Corp. is continuing its schedule of 140 daily. In the first six months the company reports business to have reached about 18,000 of its planned 30,000 output for the year.

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Truck Maker Should Proceed Cautiously in Stocking Up His Dealer

By WALTER E. PARKER
President of the Commerce Motor Car Co.

Detroit, July 11.

BUYING by farmers the remaining part of this year will be important to truck producers mainly in that it will clear the way for safe, steady buying next year. The clearing up of unsold trucks in the farm sections of the country will release capital to both dealers and manufacturers and will make business conditions easier. I do not look for a large demand upon truck factories this fall, due to farm buying.

There is a large field for dealer development by the truck companies in the farming states, and the time following the opening of the farm market should be productive of good results. Many dealers became discouraged in the past two years and dropped out of the truck business. The return of buying, with the promise of steady business in the future, should induce many to come back. Before going extensively into the development of new sales outlets in these territories, however, the manufacturer should be sure conditions are right for truck business. Otherwise there will be additions to the ranks of discouraged dealers and increases in the surpluses of vehicles.

Probabilities are small of the automotive industry being compelled to halt at any time, due to the settlement of the coal strike and the consequent congestion of railway shipping facilities. There will undoubtedly be a severe tie-up in traffic while coal is being rushed through, but the automotive industry can always resort to driveaways. There may be an inclination among some manufacturers to stock dealers up against a possible rail tie-up, but I regard such action as unnecessary. Manufacturers should be cautious in stocking dealers, no matter what the conditions are.

The truck business has been good in the industrial cities of the East and Middle West, and I look for most of the business this year to come from these sources. Heavy-duty truck demand is showing steady gains. Business in buses is advancing steadily, but the greatest development in the bus business will not come until the street railway and interurban companies adopt them and operate them as feeder lines. The weak financial position of most of the railway companies, however, makes this prospect poor at this time.

In my opinion, the operation of buses by individual owners will give way to the operation of charabancs, or other light passenger-carrying vehicles, for reasons of economy and comfort. In most cities the operation of the heavy vehicles, except in rush hours, is not on a paying basis, and their heavy construction makes riding conditions poor except under full load. Cities where the charabanc is in competition with buses show them to be much more popular with passengers and more paying to owners.

Parking congestion in cities is adding to the popularity of numerous passenger-carrying vehicles, car owners preferring to make trips to and from their business places in this way rather than encounter difficulties in getting parking space. In some states and cities the automotive competition with railway lines has been set back temporarily, but there will be steady progress in the development of the additional transportation service.

Anti-Bus Measure Defeat Is Sought in Georgia

ATLANTA, July 10—The recently organized Georgia Bus Line Association, at a meeting in Atlanta early this month, decided to make a determined effort before the present session of the Georgia State Legislature to defeat the passage of a bill being sought by the short line railroads of the state, which, if passed, would make the bus a common carrier subject to the same rules and regulations as the railroads.

The association expressed itself as willing to confer with the railroads relative to a bill less stringent than the one proposed.

Export Gain Shown by Wisconsin Parts

Truck Sales Reported Improved in Europe—English Company Has New Model

OSHKOSH, WIS., July 11—Marked improvement in its export business is reported by the Wisconsin Parts Co. Nearly 25 per cent of its May shipments of truck axles went to the export trade which represented a decided increase over any previous month. Sales in June were equally as good and July promises to be even better.

European representatives of the company report such an improvement in truck sales that several manufacturers are planning for extensive production. One English company is arranging to bring out a new speed truck which will be placed in production before the end of the year.

The demand from foreign countries is fairly well divided between worm drive and double reduction models. The former is used on trucks up to two and three-ton capacity and the latter on heavy duty types. Four of the largest truck builders in England follow this practice exclusively, and although several other manufacturers have retained the chain drive, the tendency is toward the use of the worm on light short hauls with the double reduction in the heavier sizes for long distance trucking.

The special double reduction bus and trackless trolley types which the company is now producing have been well received by the trade. Two bus models are offered suitable for 18-25 and 30-50 passenger pay loads. These models provide special treads, low top clearance and a wide range of gear reduction as well as many optional features.

A special reverse gear rail car axle is being developed in collaboration with railway engineers in which standard railway practice is modified to meet new conditions. Exhaustive road tests will be made in the near future.

Beaudette Sells Plant to Fisher Body Corp.

PONTIAC, MICH., July 10—The plant and real estate of the O. J. Beaudette Co. here has been sold to the Fisher Body Corp. of Detroit, according to an announcement by O. J. Beaudette, for thirty-two years engaged in the automobile body manufacturing business in this city. The Fisher corporation will take possession as soon as the present Beaudette contract with the Ford Motor Co. is filled, which will be about Aug. 10.

The corporation will begin arrangements at once to put the plant at work to capacity. It has been running light, but can give work to about 2000 men. "We will have the plant running full within 90 days," said President Fred J. Fisher. The plant includes 10.4 acres of real estate fronting on three streets and on the Grand Trunk Railroad tracks and has about 300,000 sq. ft. of floor space.

It is understood that Fisher will use the plant for making open bodies on General Motors contracts. Beaudette during the past sixteen years has been employing the plant on Ford contracts and during that time has made in excess of 1,000,000 bodies. Originally the shop was a buggy body plant. Beaudette will retire from business.

Dividend on Preferred Passed by Seiberling

AKRON, July 10—The Seiberling Rubber Co. has informed its preferred stockholders that the dividend due July 1 has been passed as a measure to conserve capital and cash resources.

It was generally understood that the dividend would be paid because semi-official statements by officials of the company indicated that the dividend had been easily earned during the first half of the year.

Sales of the company, as given in the letter to the stockholders, indicates that business during the first year may approximate $5,000,000. During March sales amounted to $229,000, April $291,000, and May $435,000, the letter to the stockholders states. It is estimated that June sales will amount to $550,000, although this has not been officially confirmed since the issuance of the letter.

That expenses incident to the starting of a new business has decreased net earnings somewhat is also pointed out by Seiberling in his letter to stockholders. Announcements regarding increases in production are lacking, although the statement that sales are increasing has been made officially.

G. M. Report Will Show Bank Loans Liquidated

WILMINGTON, DEL., July 10—While the balance sheet for the General Motors Corp. has not been issued, it is learned on reliable authority that it will show operating profits of between $30,000,000 and $33,000,000 for the first six months of the current year, considerably exceeding the expectations of the officers.

The company has liquidated all of its bank loans, which at their peak totaled $80,000,000. Resumption of dividends on common stock depends on the volume of business for the remainder of the year. The inventory, it is said, will show under estimates of values, rather than over estimates. The company showed a final deficit of $65,000,000 at the close of 1921.

WINTON DROPS BRANCH

BOSTON, July 10—The Winton Co. has discontiued its branch in Boston and turned the New England territory over to George W. Canterbury, who will act as distributor. This was one of the first branches opened by the company and has been continuously handled as such for more than twenty years.

Moline Plow Expands Distributing System

Is Getting Away from Custom of Having Dealers at Every Crossroads

MOLINE, ILL., July 11—A new plan of merchandising farm implements has been adopted by the Moline Plow Co., and George N. Peek, president and exponent of the plan, hopes to start a movement that will very largely revolutionize the merchandising of farm machinery.

The plan is to get away from the great numbers of small implement dealers, many located at crossroads, and none of whom have made money or been capable of giving the necessary service or even making sales. In place of these dealers, Peek aims to develop distributors at distributing centers, these to serve a large territory and have a large volume of sales.

The company, which had twenty-four factory branches, has already reduced this number to nine, and the appointment of distributors has been under way for some months. This change is to get away from the old method of distributing implements, which Peek describes as wasteful, and to still further complete his plan, a basis of cash sales has been included. It is founded on the belief that the farmer should pay cash when he can.

In the past the old order of implement dealers has required too much factory sales effort. The implement manufacturer, not satisfied with putting dealers at every crossroad, had to send factory representatives to instruct these dealers, to assist them in making sales, to assist them in collecting for the machinery and also in servicing it.

The Moline plan is opposed to free service because it regards free service as meaning it is generally paid for in the original price. The new Moline distributor plan is aimed to reduce the selling cost. The distributors should buy in volume and receive volume shipments, securing the economies going with both of these.

The sale of agricultural machinery is from 40 to 50 per cent.

Delaware Court Names Receiver for Premier

INDIANAPOLIS, July 10—A second receivership suit has been filed in Wilmington, Del., against the Premier Motor Corp., incorporated under Delaware laws. Chancellor Wolcott has appointed Elmer E. Mitchell of Wilmington receiver.

Like the previous suit filed in Indianapolis, the action was brought by the American Foundry Co. for $2,970, the petition alleging insolvency of the Premier concern. The Delaware action and receivership appointment is ancillary to the Indiana action by which the Fletcher Savings & Trust Co. was made receiver here July 1.

Ford Canadian Plant Will Double Output

Land Acquired for New Buildings—1000 Cars Daily Is Contemplated

DETROIT, July 11—The Ford Motor Co. of Canada, Ltd., has paid $1,000,000 for the land adjoining its border city plant, on which it is proposed to erect structures which will enable it to double its present capacity of 250 cars daily. An ultimate 1000 cars a day production is contemplated, according to W. R. Campbell, vice-president in charge of operations at the Canadian plant.

Plans for the extension of the plant activities have been worked out with Henry Ford. Engineers are now preparing plans for the buildings which will include machine, forge and body shops, and foundries. Other buildings will be added later, which will provide for the manufacture of all parts and equipment used in the Canadian Ford car.

Old Plant for Bodies

With the completion of the new buildings, the former headquarters will become the body plant. The property provides a river frontage of 2000 ft. and is served by the Grand Trunk and Essex Terminal railroads. According to Ford, the establishing of a tractor plant is contemplated in conjunction with the extension of car manufacturing facilities.

Tractor building in Canada is contingent upon the location of a water power site. Vice-President Campbell, in explaining the car expansion plans said:

We have done little construction for several years and we have come through the depression nicely. Our company has enjoyed a healthy year. The Canadian demand for our car is growing. Export business is increasing. Canada is again in a healthy condition. The Canadian market can absorb all the cars we can make and we feel that we should set the example for greater activities in the Dominion.

All engineering activities connected with the Henry Ford enterprises will be housed in a special laboratory building at Dearborn adjoining the present buildings of the company, which will be razed when the new structure is completed. The new building will be of Grecian style of architecture, one story in height and will be 800 x 200 ft. in size. The cost will approximate $500,000.

Half of Men "Scientists"

In a statement on the new building, Henry Ford said about 200 men will be employed, half of whom will be mechanics, and "we may as well call the other half scientists." None of the former buildings will be continued, Ford saying "it is better to start afresh and make the new buildings stand for something."

Referring to other activities of the Ford company, he said the glass factory at Flatrock, Mich., will soon be in full operation, as will a cement plant at River Rouge which will be operated solely for the needs of the company. This latter plant will be established to utilize slag left over from the pig iron operations at the blast furnaces. Ford also said that power for the Lincoln plant will soon be supplied from the River Rouge powerhouse by means of underground wires, nearly all of which are now in place.

Building 50 Per Cent of Bodies

DETROIT, July 11—Ford Motor Co. body plant at River Rouge reached a production of 68,128 bodies in May, 15,542 being sedan and the balance, 52,586, phaeton. With production of cars in that month reaching approximately 120,000 (excluding trucks and tractors), the company is now building more than 50 per cent of its own bodies. Of those made outside the larger part is the coupe body, which is one of the company's most popular models.

Daily production schedules set in the body plant for June were 2400 phaeton and 900 sedans.

The Ford foundries at the Rouge established a record output for cylinder blocks in a single day on May 24 when 7687 were cast. The average daily output of cylinder blocks at this time is 7100.

Erection of the electric furnaces at the Rouge is reported to be progressing rapidly, the 50-ton furnace, which will be the largest in the world of its type, will be ready in the fall. The first of two 10-ton furnaces will be completed about Sept. 1 and the second a month later. A conveyer system for carrying ingots from the pouring to the stripping operation will be an innovation in work of this kind. Three cranes with capacities of 10, 25 and 100 tons will be part of the equipment. A stripping crane will also be installed.

Ford Foreign Production

DETROIT, July 10—Another material increase in Ford foreign production is reported for May. The total was 7170 as compared with 5904 in April. The Copenhagen plant turned out 1288 cars and trucks compared with 824 in April; Sao Paulo, 228 compared with 154; Bordeaux, 1044 compared with 609; Cadiz, 410 compared with 305; Manchester, 3527 compared with 3013, and Buenos Aires, 673 compared with 350.

FRANKLIN REPORTS BEST MONTH

SYRACUSE, July 10—Franklin Automobile Co. reports that June surpassed all previous records for the month, and was the second biggest month in the history of the company. It states that practically the entire output of the factory up to Aug. 1 is now sold.

EDWARD R. CALDWELL DIES

SYRACUSE, July 10—The death is announced of Edward R. Caldwell, president of the Syracuse Rubber Co. and one of its founders. He was for many years head of the E. R. Caldwell & Son Brass Co.

Springfield Plants Report Many Orders

Truck Concerns Kept Busy Supplying Demand—Expect July to Equal June

SPRINGFIELD, OHIO, July 10—An order for ten motor trucks was booked during the past week by the Kelly-Springfield Motor Truck Co. from the company's Detroit distributor. These trucks have been sold by the distributor to persons in several of the Canadian sections which are being opened up by the company's representatives. The trucks ordered are of the 1½-ton type. Further orders were also received from the Edwards Motor Railway Co.

An order for fifteen light delivery trucks is being filled at the Springfield works of the International Harvester Co. for Sidney, Australia. Material is coming in better than heretofore and trucks are being turned out at the rate of 50 a day.

Order Aeronautical Engines

An order was booked during the past week by the Steel Products Engineering Co. from the United States Government for aeronautical engines. These are to be of the high power type air service and will be delivered in the next three months. The company has been making such engines for the Government for some time. It recently received an order to build two motor trucks with equipment for balloon operations. One will be a balloon tender chassis and the other will contain a compressure unit for the manufacture of gas in the field. The local plant is being operated with about 40 per cent of its normal force.

Karl Heinzen, advertising manager of the Westcott Motor Car Co., reports June business best since June, 1920, and that July should be equal to June.

Case Has New Model and Revises Prices

RACINE, WIS., July 13—The J. I. Case Threshing Machine Co. has brought out its new model W which replaces the previous model V. The new car is slightly longer, the wheelbase being 129 in. as against 126 on the older model. The engine bore is 3⅝ in. as against 3½ in. The stroke is the same, 5¼ in. The prices on the new model are:

5 pass. phaeton	$2,200
7 pass. phaeton	2,250
Coupe	2,850
Sedan	3,250

These prices are several hundred dollars higher than the previous model V. Prices on the model X, which is to be continued, have been reduced. Following are the old and new prices:

	Old	New
2 pass. roadster (new)	.....	$1,750
5 pass. phaeton	$1,890	1,790
Coupe (new)	.....	2,550
Sedan	2,790	2,690

Milk Shippers Seek Data from N.A.C.C.

Take Up Question of Shipment by Truck Pending I. C. C. Decision

WASHINGTON, July 11—Steps looking toward the employment of motor trucks in the transportation of milk on short line hauls from the "milk sheds" to large cities have been taken, according to Charles Holman, executive secretary of the National Milk Producers Association, composed of twenty-six allied associations and having more than 200,000 members.

Because of the excessive rates on milk and cream, which are now being transported by the railways and on which the recent reduction does not apply, the milk producers must turn to some other means of transportation, and the truck, the association believes, offers the solution.

Fenn Gathering Information

So convinced is the organization that it will be necessary to resort to truck transportation that it has asked the National Automobile Chamber of Commerce to submit proposals and data on the best method of solving the problem. The details will be worked out by the motor truck committee of the N. A. C. C., of which F. W. Fenn is secretary.

Pending the N. A. C. C. survey of the situation, the milk producers are bending their efforts toward having the Interstate Commerce Commission issue an order permitting them to lower rates on the transportation of their product. Because of the fact, however, that all milk and cream is transported by passenger and express trains, little hope is entertained for a reduction in rates.

Chief among the problems submitted to the N. A. C. C. by the Milk Federation is whether it would be more economical for the members of the association to operate truck fleets themselves or whether it would best serve their interest to organize a holding company, the stock to be sold to the milk producers, which would handle all short hauls of milk. The N. A. C. C. has also been asked to submit figures showing the relative cost of haulage by truck over dirt roads and improved highways.

Little Hope for Lower Rates

In discussing the situation, Holman said:

Figures secured by our organization indicate that we can transport our product on short hauls considerably cheaper than is being done by the railroads, because when shipping by truck we save a delivery charge to the railroads and also a delivery charge from the railroad to the distributing stations.

We have about given up hopes of securing a reduction on milk rates from the I. C. C. Our only recourse would seem to be the employment of individual trucks or the use of a comprehensive transportation system serving our members in each of the important and large cities.

General adoption of automotive transportation by our association would be a decided factor in the motor truck business of the nation, because of the number of trucks that would be required, and the fact that ours would be the first large association to adopt on a national scale, we believe, the use of motor transports in fleets for the transportation of our product.

A survey of the relative cost of truck transportation vs. railroad transportation has been made in a limited way by the milk producers themselves in Minneapolis, Philadelphia, Cincinnati and several other important milk consuming points, with the result that a big saving is shown by the motor transportation method.

This saving, however, it develops, diminishes when the haul is above 40 miles and totally disappears when the haul is in excess of 60 miles. With the milk producers the question of transportation of their product has been a succession of rate increases.

Automobile Freight Cars Number 93,433

NEW YORK, July 10——Statistics compiled by the National Automobile Chamber of Commerce show that there are now in service 93,433 automobile freight cars. An additional 7498 box cars can be used for the shipment of smaller machines. The railroads have placed orders for 12,950 new automobile cars and another 5600 are included in tentative proposals for new equipment. Recent railroad orders for new automobile cars are:

Wabash, 1500 with staggered side doors in addition to which 500 large 40-foot box cars will be converted into automobile cars; N. Y., C. & St. L., 1000, and Père Marquette 500.

The St. Louis & San Francisco will place wide staggered side doors in 1000 long furniture cars now going through their shops for repairs. The Chicago, Milwaukee & St. Paul is considering the purchase of 500 and the Northern Pacific expects to contract for 1000 within a few days.

G. M. to Boost Bus Sales for District School Use

PONTIAC, MICH., July 10—Healthy demand is being met by the motor bus model being turned out by the General Motors Truck Co. at the plant here, according to W. L. Day, general manager. Day said that, while development of this field is naturally slower than with the standard truck models, there is every indication of big business ahead, and also stated that the production of the plant thus far had been readily absorbed.

No special effort is being made to push the bus model at present, though factory officials have indicated that it is likely efforts will be made to place the machine generally on motor bus lines for interurban traffic and in consolidated district school use.

Dam Hampers Ford's Plans in Northwest

Twin Cities Must Agree Before $10,000,000 Plant Can Be Built

MINNEAPOLIS, July 11—Whether Henry Ford will build a $10,000,000 automobile parts and tractor factory in the Twin Cities seems to lie with a settlement by the two cities of the difficulties between them which have allowed the water power at the high dam at the foot of Minnehaha creek in the Mississippi river to run waste since the dam was erected five years ago. The dam was built to create a head of water to make Minneapolis the head of river navigation, or to give to that city the benefits of water transportation in competition with the railroad freight lines.

Twin City men have conferred with Henry Ford at Dearborn regarding his wishes and again will confer with him at Duluth, where he may decide to build a plant.

Cities Have Different Plans

Under the Federal law preference for use of this power shall be given first to a municipality, second to a public utility and third to an industrial. Minneapolis wants half the power to go to lighting and water plant operation in that city and the other half to St. Paul. It has a power survey under way to that end. St. Paul favors the industrial site plan, and the Northern States Power Co., operating the Minneapolis General Electric Co., would like a franchise.

So to acquire the Ford plant, which will employ 5000 men, the two cities must get together and invite Ford to build on one of two sites to be offered by the cities. He can begin work at once. Meanwhile the Ford Motor Co. is operating an assembling plant in Minneapolis on half a block of land it owns, but never has completely equipped with buildings. If the water power deal goes through, any excess power the Ford company does not require will go to the two cities.

To Eliminate Branches

S. A. Stellwagen, manager of the Minneapolis factory branch, said:

We intend to abandon our assembling plant here because it costs too much to carry on this work in a 10 story building. It should be done on the ground floor only. We could dispose of more cars than this plant can build. Although we make 315 cars a day we are 3700 cars behind orders. Mr. Ford is planning to erect several huge plants at strategic points throughout the country. He has let the contract for a plant at Troy, N. Y., and wants one in the Middle West His idea is to do away with branches entirely because of their inefficiency.

The high dam between Minneapolis and St. Paul in the Mississippi river has the gate on the Minneapolis side and the power site on the St. Paul side. The dam is a hollow core structure.

Tire Development Takes Big Strides

Goodyear and Firestone Companies Producing New Product—India Plans Addition

AKRON, July 10—Tire development, which was held up first by the war, then by the period of unprecedented production expansion, and later by the industrial depression, has been revived, and new tires and new ideas in the tire field are following one another rapidly in the rubber center.

During the first part of the month the Goodyear Tire & Rubber Co. announced the production of a smaller diameter tire for buses and trucks.

Announcements of extending the cross rib tire line to bus and truck sizes followed the announcement of the new line. Innovations in the form of using the Goodyear cross rib design upon cushion tires and several new cord sizes for buses and trucks completed the Goodyear announcement.

New Firestone Cord

At the same time the Firestone Tire & Rubber Co. announced that a new line of small cord tires, especially designed for light trucks and buses, has been developed and will be placed on the market in the near future.

The India Tire & Rubber Co. announced that while the company is now making a smaller cord tire to follow the Goodyear cross-rib lead, plans are being made for the highest quality tire the company has ever produced and that production on the new tire will be started in a few months.

The Goodyear smaller diameter tire is intended to bring the body of both buses and trucks closer to the ground and facilitate loading and unloading, to decrease sideswaying of the vehicle, and also to decrease the danger of overturning. The company has made arrangements with several manufacturers to use the tire as new equipment. Changes in body and axle construction are necessary before the new tire can be used, but the manufacturers have assured the company that these will be made in the interest of the advantages to be given by the new tire.

Goodyear Extending Line

The extension of the cross rib tire by Goodyear into the bus and truck field means an actual price cut, in the opinion of some of the rubber men in Akron, because the new tire will sell for 25 per cent below present prices. The cross rib line was offered the public for passenger cars several months ago at 20 per cent below standard lists, and the industry as a whole immediately either followed the Goodyear lead or made concessions in price to dealers and consumers which amounted to a price cut. The same action is anticipated in the truck and bus line following the production of the larger cross rib tires.

The use of the all-weather design on cushion tires, designed for light trucks and, perhaps, buses will materially increase the traction of the tire. Goodyear was one of the first to build a hollowed out cushion tire, and the addition of the tread is the most important development made during the past few years, according to company officials.

Details of the Firestone tire designed for lighter trucks and buses have not been given out, the company thus far having confined its announcements to the bare statement that the new tire will be available in the very near future. That the new tire, made in passenger car sizes, will be able to stand a great deal more wear than those made for passenger vehicles, is the contention of the company.

India's Higher Priced Tire

While the tire prices have tended gradually and constantly downward during the past year, either through the production of cheaper cord tires, special discounts or actual cuts, the India Tire & Rubber Co. officials state that they have been assured by dealers that the consumers are ready to accept a new and higher quality tire than has heretofore been offered. For that reason plans are under way to make the highest quality tire at the highest price the company has ever made. Since its inception, the company has catered to quality trade rather than volume at a price, and the announcement regarding the present move is looked upon as remarkable in the face of present tendencies in tire prices.

RAIL CAR EQUIPMENT APPEARS IN CANADA

TORONTO, July 10—Canadian National Railways has placed in service between Picton and Trenton a gasoline motor car with seating capacity for 30 passengers, which will operate in conjunction with steam train service, giving five trains a day each way except Sunday.

Canadian National Railways is obtaining more of the individual unit type of cars which will supplement the steam trains and make possible the economic operation of train service of greater frequency in various localities.

LEADS CANADIAN IMPORTS

TORONTO, July 10—Canadian automobile importation for the fiscal year just ended totaled 7181 cars valued at $9,501,362 and 806 trucks valued at $1,534,765, according to a report made in the House of Commons at Ottawa. Last year 5907 cars valued at $8,399,537 and 1706 trucks, of which the value was $3,598,938, were reported. The bulk of importations was from the United States and covered the higher priced cars.

June Pace Followed in Output of Tires

Demand for Original Equipment Accompanies Increased Call for Automobiles

AKRON, July 10—Production of tires during the first part of July was maintained at the pace attained during the latter part of June in spite of the predictions made during the early part of the previous month that decreases in production might be expected during the early part of July.

The manner in which sales of new automobiles and used cars continue throughout the United States and foreign countries has proved a surprise to the rubber industry, which to a large extent depends upon sales to the manufacturers of original equipment tires for volume of business.

It is semi-officially estimated that production in the Akron district continues at the rate of approximately 105,000 tires a day, but no increases, with the exception of smaller ones in the smaller companies, have been registered during the past three weeks.

Companies at High Speed

Goodyear Tire & Rubber Co. production has crept above the officially announced total of 26,000 tires a day, largely because of the sale of the low priced cord tires.

Firestone Tire & Rubber Co. is maintaining an even keel at 26,000 tires a day.

The Miller Rubber Co. is operating at the peak of its history at very close to 7000 tires a day, while the B. F. Goodrich company, which for a time was behind its competitors, has now reached a production stage comparable with its competitors. The fact that Goodrich has not taken any original equipment business and is depending almost entirely upon dealers' business has not made possible the volume production which has been registered in some of the other large plants.

Unemployment has been entirely wiped out in Akron and every tire worker in the city is employed, as far as can be learned from the most authoritative sources.

ALLEN BUCYRUS PLANT SOLD

BUCYRUS, OHIO, July 11—The Shunk Manufacturing Co., manufacturers of magnetos and various metal products, has purchased the plant of the Allen Motor Co. here at auction. The sale has been confirmed by the United States District Court at Columbus and steps are being taken to occupy the plant.

All personal property of the company both here and at Columbus was also disposed of, but the real estate in Columbus remains unsold, the best bid being $150,000 while the appraised value of the property is $303,830.

Crops Portend Good Fall Farm Market

Automobile Executives Report on Conditions Through South and West

DETROIT, July 11—Business trips through three widely separated sections of the country by leading executives of three large producing companies in the latter part of June give indications of a satisfactory volume of business both for the immediate present and through the summer season.

W. J. Mattimore, advertising manager of the Maxwell Motor Corp., has concluded a trip from Richmond, Va., to Jacksonville, Fla., on which he visited important distributing conters along the coast. Practically all of the business now being done in this section, he said, is in the cities, with little buying in the farm sections. Prospects for crops, however, he said, were good and many farmers and planters are beginning to show an interest in cars. The district has been heavily in debt owing to the poor market conditions of the past two years, but bankers are looking to the marketing of this year's products to place the section in healthy financial condition.

Dealers Placing Orders

Bumper crops will be the rule in Texas and that section of the South adjacent to the Mississippi, according to D. Minard Shaw, assistant sales manager of Earl Motors. Texas farmers have cashed in heavily on tomatoes, and other products now approaching the markets promise to yield equally satisfactory returns. Louisiana and Mississippi farmers are also in a position to reap bountiful returns, and there is every indication of a strong market for cars. Dealers in this section are beginning to place orders for cars with more confidence, Shaw said.

Conditions in the West and Southwest are improving rapidly, reports J. J. Cole, Jr., of the Cole Motor Car Co. Dealers are ordering cars for summer delivery, and many new connections are being made indicating renewed interest and confidence in the sales possibilities for cars. Crops, including wheat, rye, and fruit in Minnesota and the Dakotas, berries in Arkansas and southern Missouri, and wool in Montana, are doing well and finding good markets. Oil is in better condition in Texas and Oklahoma than for some time, he said, and there is much greater activity in the mining centers of Colorado.

OAKLAND EXPECTS NO SLUMP

PONTIAC, MICH., July 10 — More orders are booked ahead for July production at the plant of the Oakland Motor Car Co. here than have been on the books at any time in the past ten months, according to W. R. Tracy, assistant sales manager. July promises to exceed June business, which was 50 per cent better than that of the previous June and closely approached that of June, 1920, according to Tracy.

Sales in June were greater than any month since the new Oakland 6-44 models were put out. The sales department, moreover, says advance indications are that August and September will see increased business, with the entry of many farmers into the automobile buying market. This is so strongly indicated that no "summer slump" in manufacture is anticipated by the Oakland plant officials.

Mason Starts Producing in Old Owen Tire Plant

AKRON, July 11—Mason Tire & Rubber Co. has started production of Ford size cord tires in the Owen Tire & Rubber Co. plant, which was purchased at receiver's sale several weeks ago, and new orders which are received by the company will make possible the increasing of production to the 2000 goal set when the plant was purchased.

At the same time it was stated by company officials that a fourth fabric mill would probably be purchased in the near future to provide sufficient fabric for the two plants. The company has three mills which produce a total of 5,000,000 pounds of automobile tire fabric at the present time, but this, it is said, is insufficient to provide the two plants with material. The fourth mill will probably be purchased in the South where two of the company's mills are located.

Mason sales for June were in excess of $1,250,000 in the tire department. The company has also announced resumption of preferred dividend payment as well as redemption of scrip dividend issued last year.

With the exception of the new Ford size cord tire, the company continues to specialize on one line of tires, thus reducing production costs. The original plant is operating three shifts a day.

WHITE REDUCES NOTES PAYABLE

CLEVELAND, July 10—Truck sales for The White Co. for the second quarter showed an increase of 40 per cent over the first quarter and 23 per cent over the second quarter of 1921. June was the best month since September, 1920. The company has on hand $2,500,000 in cash and its notes payable have been reduced to $1,200,000. Inventories now are at a minimum and the production schedule is being gradually increased to meet current demand.

RAILWAY INCREASES BUSES

AKRON, July 11—The Northern Ohio Traction & Light Co. has received the first of eleven new buses which will be added to the three already in operation as auxiliaries to the street car line. The company inaugurated the policy of supplementing street car service with buses several months ago and is now hauling approximately 4000 passengers a day. Increased private bus and "jitney" competition also made the bus innovation necessary.

Farm Products Move with Rising Prices

Minneapolis Bank Deposits Grow —Loans Reduced—Credit Facilities Improve

MINNEAPOLIS, July 10—With the reservation that some six weeks remain of the growing period before the crops of the Northwest get through the critical period, the Ninth Federal Reserve Bank strikes an optimistic note. Marked increases in the production of rye, oats, barley and spring wheat are noted as compared with last year's yield.

The closing month has been characterized by a movement of farm products to market greater than normal and at rising prices, while manufacturing and building operations have increased, giving practically full employment to labor. Employment has undergone a noticeable change in 30 days, because all labor wanting work is able to find it, and employers for the first time in two years are not able quickly to find needed help.

Improved conditions have been reflected in a greater use of credit facilities which remain amply sufficient to finance this activity. The commercial banking situation in the Northwest apparently has returned to the level of the fall of 1919. This does not take into account the new loans by the War Finance Corp. and the farm land banks, and the seed loans by the Government.

Bank Deposits Larger

Deposits in Minneapolis banks on the July call are more than $8,500,000 larger than a year ago, and loans are reduced more than $26,000,000 from a year ago. Deposits were $235,460,730. In thirty-five St. Paul financial institutions deposits gained $8,812,194 over last year, and resources $2,922,688.

Investigation by the Minneapolis Civic and Commerce Association shows manufacturing operations 95 per cent of normal. Only in the making of farm implements and farm machinery were the conditions below normal. However, these men are leaning on the crop prospect for increased volume of business later. Automobile accessory manufacturers were found operating at capacity, one of them planning expansion to keep up with business.

DURANT ADDITIONS IN CANADA

DETROIT, July 10—Plans for the erection of a $2,000,000 addition to the Durant plants at Toronto are being prepared by a Lansing construction company. This plant will provide for the manufacture of the Star car for the Dominion trade and will also be used to furnish additional manufacturing facilities for the Durant four.

The Oakland Car plant of the Durant company will begin production of the Durant four on July 15.

Men of the Industry and What They Are Doing

Jordan Addresses "Hundred Club"

Edward S. Jordan, president of the Jordan Motor Car Co., was one of the speakers before the "Hundred Club" of the Addressograph Co. at its convention at the Drake Hotel, Chicago.

Rieman Heads Air Bureau

Charles S. Rieman, president of the Elgin Motor Car Co., is president of the Chicago Aeronautical Bureau, under whose auspices an aircraft exhibition and aeronautical congress will be held in Chicago, Aug. 4 to 13. Contests of airplanes and hydroairplanes will be held in Grant Park, extending along the lake shore.

Chapman Goes with Dorris

W. A. Chapman, formerly connected with the Skelton car, produced in the automobile department of the St. Louis Car Co., has been appointed director of sales of the Dorris Motor Car Co. Chapman entered the automobile field from the farm implement business, having been manager of the Oklahoma City branch of the Rock Island Plow Co. Later he served as field supervisor for the Dort Motor Car Co. He joined Skelton as general manager of distributing firms in a number of southwestern cities. When Skelton organized the Skelton Motor Car Co., Chapman became vice-president and general manager.

Ewing, Martin-Parry Sales Head

Joseph Ewing, assistant to the president of the Martin-Parry Corp., has been appointed director of sales with George Hotte as his assistant. During his previous capacity he introduced unique angles of merchandising of the corporation's products, which improved the methods of marketing commercial vehicles. His plans of educational series throughout this year have proved notable in their success.

Peterson Succeeds Rogers

H. L. Peterson has been appointed assistant sales manager of the Nordyke & Marmon Co., to succeed A. J. Rogers, resigned. Peterson has been connected with the sales organization for a number of years. Rogers resigned in order that he might devote more time to other interests.

Welchans Joins J. & B.

Edward Welchans, formerly engineer for the American Bosch Magneto Corp., has become chief engineer for the J. & B. Manufacturing Co., Pittsfield, Mass. Welchans has specialized in the design and production of ignition systems and starting and lighting equipment. He is a graduate of Drexel Institute and Massachusetts Institute of Technology. With the J. & B. Manufacturing Co. he will have charge of engineering in connection with ignition products of that company.

Wetherbee Joins Eagle Truck

C. A. Wetherbee, for many years connected with the truck business in St. Louis, has been appointed general sales manager of the Eagle Motor Truck Corp., manufacturer of the Eagle Truck.

Sullivan with Hudson-Essex Agency

W. L. Sullivan, previously associated with the advertising department of the Oakland Motor Car Co. and later serving in the retail field in Washington state, is now connected with the Hudson-Essex agency at Mt. Clemens, Mich.

McEvoy Steps to Patent Section

James McEvoy, formerly in charge of the Detroit office of the legal department of the General Motors Corp., has been made director of the patent section, Advisory Staff at Detroit.

Kelly and Williams Organize

W. D. Kelly, for several years works manager of the Oakland Motor Car Co.'s plant, and G. Roy Williams, formerly with Oakland and recently a member of the Nash Michigan distributing company in Detroit, have organized the Kelly-Williams Co. to conduct a service garage, accessory shop and handle Willys-Knight, Overland and Nash cars in Pontiac, Mich.

Reeves Named for A. S. M. E.

Clifton Reeves, industrial engineer of the Willys-Overland Co., has been named chairman of the Toledo section of the American Society of Mechanical Engineers.

Waddell Joins Cooper Tire

Bart Waddell, formerly assistant export manager of the Firestone Tire & Rubber Co., has been appointed vice-president in charge of sales of the Cooper Tire & Battery Corp., Boston.

Cooke Distributing Racine

Russell Y. Cooke has resigned as general sales manager of the Racine Rubber Co. to become head of the Racine Distributing Co. of Chicago. He has been succeeded by L. M. Van Riper, for several years Western sales manager for the Ajax Rubber Co.

O'Rourke Now With Steelcraft

J. Slocum O'Rourke, recently purchasing agent for the Oakland Motor Car Co., is now a member of the Steelcraft Co. of Detroit, manufacturing steel furniture.

Fritz Leaves Research Club

George Fritz, who has been general manager of the Research Club, Chicago, for a year and a half, has resigned, his action to take effect Aug. 1. He has not announced his future plans, and no successor has yet been chosen by the club.

Fritz was the first manager employed by the club, which is an organization of jobbing houses. Prior to that connection he was for four years field secretary of the Automotive Equipment Association. He has been in the automobile industry 18 years.

Robert Weinstock, of the Weinstock-Nichols Co., San Francisco, is president of the organization.

New York Action Rouses Specialized Truck Makers

DETROIT, July 12—Motor truck companies manufacturing specialized unit vehicles are planning to investigate the reasons for discrimination by the city of New York against trucks in which specialized units are used. Decision to take this step follows the action of the city street cleaning departments in advertising for bids on trucks, in which it is specified that the engines must be built by the same company manufacturing the truck. By this stipulation the field of bidders has been limited to a half dozen companies.

It is planned to point out to the city that many of the specialized unit manufacturers have been long in the field, that trucks of this type are employed in many cities of the country with success and that the best interests of New York City or any community are not served by the limitation of its purchases to a certain restricted class. Furthermore, it will be asserted that this discrimination is unfair to the representatives of the companies doing business and maintaining properties in the city.

Durant Submits Plan for Buying Locomobile

NEW YORK, July 13—W. C. Durant has presented to the receivers of the Locomobile Co. a proposition to take over the property on a basis which is satisfactory to them. This proposal now has been put up to the creditors' committee with the recommendation of the receivers that it be accepted.

It is understood that the Durant plan does not contemplate a cash transaction, but rather the promotion of a new company and an exchange of stock for that of the present Locomobile Co. and to creditors in settlement of their claims. It is assumed that Durant will retain control. So far as can be learned he has not worked out in detail his plan for turning out the Locomobile in a lower price class if he gets the factory at Bridgeport. Announcement of a decision by the creditors' committee is expected very soon.

Midwest Engine Sold and Sale Confirmed

Court Overrules Motion of Stockholder Asking New Receivers Be Appointed

INDIANAPOLIS, July 12—Assets of the Midwest Engine Co. have been sold for $312,500 to the reorganization committee which assumes mortgages aggregating $1,750,000.

In confirming the sale, Judge Solon J. Carter of the Superior Court overruled a motion filed by George Ayers, a minority stockholder, seeking the discharge of the receivers and the appointment of new receivers. Counsel for Ayres intimated that further court action would be taken, asserting that the reorganization committee was seeking to destroy the value of the present capital stock and that this committee was formed prior to the appointment of receivers.

The reorganization committee contends that after the appointment of receivers, stockholders subscribed $1,000,000 for the refinancing and continuation of the business under the name of the Midwest Engine Corp. This committee includes L. E. Pierson of Cincinnati, E. W. Stout and Homer McKee of Indianapolis.

Marked improvement in the business of the company was reported to the court by the committee and announcement was made that the new contracts aggregating several thousand dollars would be assigned after the confirmation of the sale.

Winton Finances Advance Toward Normal Conditions

CLEVELAND, July 12—The Winton Co., which was caught in the aftermath of the depression of 1920, has been making rapid progress in restoring its finances to normal condition.

Since October, 1921, the company has been operated under the supervision of a creditors' committee, represented by Edwin McEwen as general manager. During that time 50 per cent of the indebtedness has been paid off in cash and the company has current assets double the amount of the balance remaining to be paid.

During the past nine months the company has brought out a new model which has met with favor in the trade.

Among more important matters of policy, it has been gradually substituting dealer representation for an extensive branch system for the distribution of its cars. In the past month it has disposed of the large New York and Boston branch establishments and has been fortunate in making strong connections in replacing the branches.

PROTEST URGING USE OF HORSES

TORONTO, ONT., July 11—The Ford Motor Co. of Canada, Ltd., has issued a strong protest against the campaign now being carried on by the Dominion livestock branch of the Department of Agriculture at Ottawa, encouraging the use of horses on farms.

The Ford company and other tractor manufacturers resent the use of their money in propagating ideas detrimental to their business. Appeals have been made to the Department of Trade and Commerce, the Canadian Manufacturers Association and the Association of Canadian Advertisers.

Hudson Reports Heavy Orders from Farm Belt

DETROIT, July 11—Comparing business for the first six months of this year with 1920, the former leading production year, Hudson Motor Car Co. declares that sales for the six months' period have been 95 per cent of the total sales in the same period of 1920. Before Sept. 1 production is expected to pass the production figure for the first eight months of 1920, and the output for the remainder of this year will run far ahead of the latter part of the former record holder.

July sales will be about 18 per cent greater than in July, 1920. The August output will be more than 50 per cent higher than in August, 1920, and more than 200 per cent greater than in 1921. June sales were the largest for any single month in the company's history.

Indications that the farmer will soon come into the market are found by the company in the fact that heavy orders are coming in from distributors in the farm belts. This is particularly true at the southern points. Dealers on the eastern coast and the Pacific Northwest down to San Francisco and east to Salt Lake City are also reported placing unusually large shipments.

Senate Begins Probe of Gasoline Prices

WASHINGTON, July 11—The Senate's investigation of the price of gasoline and oil got under way to-day. The inquiry is being conducted by a special committee, appointed from members of the Senate Manufacturing Committee, seeking to find the cause for recent increases in the retail prices of gasoline and allied products.

The personnel of the committee includes Senator Robert M. LaFollette, chairman of the committee, and Senators McNary of Oregon, Jones of New Mexico and Smith of South Carolina.

The taking of testimony will begin next Monday, the committee announces.

BEST OVERLAND QUARTER

TOLEDO, July 12—The Willys-Overland Co. reports that the second quarter of 1922 was one of the best business periods it has had in years. Orders on hand indicate that shipments for the next quarter will exceed 50,000 cars. Compared with the first five months of 1921, Willys-Overland sales increased 348 per cent in the same period of 1922.

Aeronautic Chamber Renames Governors

General Manager Bradley Reports 176 Members at First Annual Meeting

NEW YORK, July 11—Since its organization six months ago, the Aeronautical Chamber of Commerce has gained seventy-six members, and now has a total of 176. General Manager S. S. Bradley, in his report at the first annual meeting of the chamber held today, expressed the views of the governing board when he stated that the membership would be increased pretty generously during the coming year.

The old governors, who held office for 6 months, were re-elected.

Among the activities of the chamber the advocacy and encouragement of a plan to develop night flying of the air mail has received steady support from the chamber. At the request of the Post Office Department, the results of a canvass of the industrial needs for such a service were compiled, the different chambers of commerce of the country favoring such a plan.

Co-operate with Government

In these formative days of the aviation industry the chamber has devoted a good deal of its efforts to co-operation with such Government departments as the Army, Navy, Post Office, and Department of Commerce and to civil aviation organizations throughout the country. It has co-operated with Garden City, Long Island and Baltimore in the promotion of flying meets and is co-operating with Detroit and Chicago in their scheduled aerial contests.

The 1922 Aircraft Year Book has been issued by the chamber, and is a very useful volume. A new feature is 18 pages devoted to aviation engines, the illustrations including side and end elevations. The volume containing 250 pages is filled with information pertinent to aeronautics. One division of 40 pages is a country-by-country review of the present status of aeronautics. Other chapters tell of technical progress made during the past year, problems of aerial transport, and furnish lists of aircraft manufacturing concerns.

Governors of Chamber

The governors re-elected and from whom the officers for the ensuing year will be chosen are:

Grover C. Loening, Loening Aeronautical Engineering Corp.; Chas. F. Redden, Aeromarine Airways, Inc.; C. C. Witmer, Airships Manufacturing Co. of America; B. E. Bushnell, Stewart Hartshorn Co.; Chas. H. Colvin, Pioneer Instrument Co.; S. M. Fairchild, Fairchild Aerial Camera Corp.; John M. Larsen, J. L. Aircraft Corp.; Lawrence Sperry, Aircraft Corp.; Frank H. Russell, Curtiss Aeroplane Motor Corp.; F. B. Rentschler, Wright Aeronautical Corp., and S. S. Bradley, Manufacturers Aircraft Association, Inc.

Car Makers Keeping to June Schedules

Demand Reported Steady with Decline from Rush of Early Spring

(*Continued from page* 87)

Chevrolet Motors is continuing on its schedule of about 1000 daily. June production being about on a par with May. Buick has operated on part time in June owing to plant changes, but is prepared to resume on its regular schedule of about 350 cars daily in July. Oldsmobile is building at the rate of about 120 daily, a reduction from the May and June totals which were about alike. Oakland is running better than 100 cars daily and reports July business will be on a par with May and June.

Studebaker, because of the pressure of business, has postponed its regular inventory period and will continue manufacturing throughout July at the rate of 440 cars daily in all plants. This is at the same rate as in May and June and represents the utmost that the present plants are capable of producing. Paige produced about 4000 cars in June in its Paige and Jewett models, the total being about equal to the May output.

Cadillac is operating on a schedule of about 100 daily, but looks for a seasonal falling in business toward the end of the month and in August. June production was about equal with May. Wills Ste. Claire will be down for inventory in the first week of the month, but will resume on its schedule of 25 to 30 daily, working two shifts. Packard production in June on all models was about 1800. July schedules call for a total of 2000 cars and trucks. Lincoln is building about 35 cars daily and is four months' behind on orders.

Earl Motors reports June to be the banner month of the company and is continuing on a schedule of about 65 cars daily. Chalmers production is running at the rate of 25 to 30 daily. Liberty is building 30 to 35 cars daily, plant capacity, and will continue at this rate through July and August.

Rickenbacker is continuing its schedule of 25 cars daily through July, and reports June to be about equal to May. Reo closed in the first two weeks of July for the regular vacation period.

BUYS DENBY PLANT

DETROIT, July 12—The L. A. Young Industries, Inc., manufacturer of automobile equipment and material, has bought the plant of the Denby Motor Truck Co., which adjoins it in this city, and is preparing to extend its manufacturing facilities. With the Denby property and an addition to the present plant it is now building, it will have an additional 300,000 ft. of space.

The Denby company will continue its truck manufacturing business in two of the buildings of its former property, having taken a lease on these for a year while preparing to move to another manufacturing site. The sale of the property gives the Denby company a large addition to its working capital.

JUNE OUTPUT GAINS 6 PER CENT OVER MAY AND 51 PER CENT OVER YEAR AGO

NEW YORK, July 12—With the figures only 90 per cent complete, reports made to the National Automobile Chamber of Commerce show that June shipments of passenger cars and trucks totalled 271,000, a gain of 15,000, or 6 per cent over May and of 51 per cent over June 1921. The following table shows the factory shipment figures for the first six months of 1920, 1921 and 1922:

	Carloads			Driveaways			Boat		
	1920	1921	1922	1920	1921	1922	1920	1921	1922
January	20,057	6,485	15,241	29,283	3,185	7,397	....	93	154
February	25,505	9,986	19,600	43,719	1,507	9,950	....	99	169
March	29,236	16,287	27,380	57,273	9,930	15,800	....	75	264
April	17,147	20,187	30,200	64,634	14,197	22,500	....	1,619	3,200
May	21,977	18,608	33,810	74,286	15,193	28,710	....	2,381	7,220
June	22,516	20,269	33,000	60,746	18,384	30,500	8,350	3,947	7,900

Factory shipments for the other months of 1920 and 1921 follow:

	Carloads		Driveaways		Boat	
	1920	1921	1920	1921	1920	1921
July	23,082	19,470	52,342	15,320	8,702	3,725
August	23,386	20,350	34,060	14,290	7,095	3,565
September	20,804	20,150	24,431	13,550	5,469	3,580
October	17,209	17,323	14,127	11,257	2,519	2,300
November	13,253	14,061	9,497	10,509	659	1,385
December	11,802	12,100	6,469	7,500	89	134

Production in June Aggregated 271,000

(*Continued from page* 86)

of the companies are preparing to bring out new models, but there will be no revolutionary changes in design. Many refinements and comforts will be added and body lines will be modified.

Whatever price changes are made for the remainder of the year will be confined largely to the closed car field. The tendency will be downward. It is practically certain there will be few changes in price on open cars which now are selling as cheaply as it is possible to put them out and return a profit. The tendency is towards a whittling down of the differential in prices on the two classes of models.

Higher Court Reverses Decision in Tire Suit

ASHEVILLE, N. C., July 10—The Circuit Court of Appeals, sitting here, has handed down a decision in the case of the Firestone Tire & Rubber Co., appellants, vs. the Marlboro Cotton Mills, of Marlboro, S. C., reversing in part the decision of the district court at Charleston, S. C., directing that court to grant a temporary injunction until a final hearing should determine how the default judgment was obtained.

The case grew out of a default judgment issued against the Firestone company for breach of contract, involving $121,492.05 damages for the alleged failure to fulfill contractural obligations.

Associated Motors May Get Additions

NEW YORK, July 12—Associated Motor Industries, which was officially launched two weeks ago, is understood to be negotiating with four other companies in addition to those already included. It is stated that eight additional companies ultimately will be absorbed.

The company plans a production from July 1, 1922, to July 1, 1923, of 30,000 automobiles and 13,000 trucks. The passenger cars to be sold under the "National" name will embrace four-cylinder, light-six and deluxe six models. A complete line of "Traffic" trucks will be made, ranging from a "speed-boy" to a 3½-ton unit.

Associated Motor Industries, as it now stands, has assets of about $25,000,000, of which roughly half is fixed and half liquid. Against the $25,000,000 assets will be issued $6,000,000 10 year 7½ per cent bonds, which have been underwritten and will shortly be offered to the public; $9,500,000 8 per cent preferred and 187,000 shares of common.

Owners of constituent companies receive only stock in payment, and no company enters the combination unless net assets are three time liabilities. Application will be made to list the preferred on Chicago and New York Stock Exchanges. An early offering of $3,500,000 preferred is contemplated by Chicago banking houses.

NEW WHITE BUILDING

KANSAS CITY, July 10—Ground has been broken for the first of four buildings to be constructed here by the White Co. of Cleveland. The structure, which will be completed in four months, will cost $100,000. It will have a 100-foot frontage and will be 250 feet deep. Construction will be of concrete and brick.

Form Watson Truck from Old Company

Financial Affairs of Canastota Manufacturer Straightened Out —Business Advances

SYRACUSE, July 10—With the financial affairs of the Watson Products Corp. of Canastota, which has been in the hands of a receiver for more than a year, being straightened out in the winding up of the equity action, announcement is made that the company will continue to make one, one and a half and three ton trucks and five ton tractors. The new models are now on test.

The net value of the assets June 1 was given as $1,044,424. It is proposed to dispose of the claims of creditors amounting to $526,000 by issuing to them Class A 7 per cent cumulative preferred stock in that amount at par value in the new Watson Truck Corp. Watson Products Corp. stockholders will receive Class B 8 per cent cumulative preferred and common stock in the new corporation in exchange for their present holdings.

Net earnings of the corporation in May were $11,000. Sales are running 100 per cent above last year. When the receiver took charge of the affairs in January, 1921, the company had only $252 cash on hand and no accounts receivable. On June 1 the receiver had $19,744 cash on hand and accounts receivable of $11,160. A chattel mortgage has been reduced from $150,000 to $33,907 since the action in equity was started.

Federal Judge Ray to whom the reorganization plans have been submitted is expected to approve them within two weeks.

New York National Show to Be Held Week of Jan. 6

BUFFALO, July 13—The most important action taken at the meeting of the directors of the National Automobile Chamber of Commerce at the Buffalo Country Club yesterday was the decision to hold the annual New York show the week of Jan. 6.

Colonel Charles Clifton, president of the N. A. C. C., presided at the meeting. Reports received by General Manager Reeves show that sales of cars and trucks are holding up well all over the country but that something of a slowing-up can be expected soon. Much gratification was expressed over the extraordinary production record of 271,000 cars and trucks in June.

LONG DISTANCE BUSES

BOSTON, July 10—A new era in transportation in this section will be inaugurated when "The Mohawk" starts on the first of a series of trips through the Berkshires and over the Mohawk Trail to Albany, there to make connections with Hudson River steamers and the trains for Canada. It is owned and operated by George E. Master's, Inc. tourist agents.

This special job comprises a limousine built to order by the White Co. It will carry 15 passengers. The chassis has a 198 in. wheelbase with semi-elliptic springs, 41½ in. long in front and 60 in. rear. The engine is 50 horsepower. Dual wheels are on the rear to insure stability and prevent skidding, and large brake surface enables the car to be stopped quickly.

Sale of Pan-American Netted Receiver $17,425

DECATUR, ILL., July 11—Receipts of the Pan-American Motors Corp. auction sale amounted to $19,817, according to a detailed report filed in the circuit court by the receiver. The expense of the sale was slightly above $2,000, leaving $17,425 to be applied upon the dividend. The sale disposed of machinery, accessories, parts and other materials, which had been inventoried at $100,000, indicating a shrinkage of more than 80 per cent.

Roadster bodies brought $25, while a collection of nineteen taxicab bodies brought only $570 for the lot. Two sedan bodies went for $100. Wire wheels went for a song, 189 sets bringing as many dollars. One firm bought 66 sets of fenders for $147, while 330 tanks brought but $433. A collection of 344 springs went for $119.

The total was so far below expectations that the amount to be distributed among the stockholders will be very small.

Motor Bus Line Planned from Toronto to Buffalo

HAMILTON, ONT., July 11—Plans have been made by the United Lines, Ltd., for the inauguration of motor bus service from Toronto to Buffalo. This will be the longest bus line in the Dominion giving through single service over one connecting line.

Offices have been opened in the Landed Banking & Loan Building, and in addition to operating bus service, the corporation will establish truck lines to all outlying shipping centers in any way trading with this city. It is proposed to place approximately 50 freight trucks in operation first, to be run on a reliable daily schedule.

To Use Planes and Trucks for Mails, If Necessary

WASHINGTON, July 13—Postmaster General Work has had plans prepared under which the mails can be transported independently of the railroads if operations on the carriers are interrupted more seriously by the strike. Work says the department has available 70 airplanes in addition to 40,000 trucks which are in daily use throughout the country, and a surplus of 2000. Two thousand more trucks could be obtained from the War Department.

Highway Aid Given to Western States

Government Help Is Necessary in Order to Complete National Transport System

WASHINGTON, July 10—Additional Federal aid for construction of good roads in states thinly populated has been extended to ten states. Fifty per cent of the cost, not to exceed $16,500 per mile, is the maximum participation in all states except those containing unappropriated public lands in excess of 5 per cent of all lands in the states.

A survey made by the Bureau of Public Roads shows that this additional aid is necessary in order that construction of important trunk line highways, through thinly settled regions, may be constructed, giving the country a national highway transport system. The following are the ten states:

State	Percentage Payable by United States
Arizona	61.11
California	59.31
Colorado	56.12
Idaho	58.01
Montana	53.04
Nevada	87.22
New Mexico	61.50
Oregon	61.13
Utah	74.85
Wyoming	64.65

A total of 12,754 miles of Federal aid highway has been constructed since the inception of the Federal-states highway and highway transport program, the bureau announces.

Minnesota in Lead

Minnesota leads with 1109.7 miles of Federal-aid highways; Texas comes second with 1017 miles; Georgia, 697 miles; Illinois, 685 miles; Wisconsin, 673 miles, and Arkansas, Idaho, Montana, Ohio, Pennsylvania, and South Carolina, with approximately 400 miles.

Good roads construction is being pushed hardest in Nebraska, Illinois ranking second and Arkansas third. Of the states named, Nebraska has completed 93 per cent of her pro-rata of good roads, Illinois 84 per cent and Arkansas 69 per cent.

Federal aid road construction during the month of May was one of the largest in the history of the Bureau. During the month projects totaling 663 miles were completed and 541 miles went under construction.

IMPOSES DUTY ON COTTON

WASHINGTON, July 13—The Senate to-day adopted a paragraph in the cotton schedule which provides for a duty of 7 cents a pound on long staple cotton. The duty was imposed to protect the long staple cotton growers of Arizona and California. Senators from those states sought to have the duty increased to 15 cents a pound, but their proposals were overwhelmingly defeated.

Dutch Rubber Plan Helps Meet Problem

Economic Situation Regarded as Serious by American Manufacturers

NEW YORK, July 11—Advices from London say that the decision of Dutch producers of rubber to seek the intervention of the Government would appear to bring a little nearer a solution of the acute problem with which the entire industry is faced by the inability of consumptive demand to absorb the heavy surplus stocks of crude material.

At the conference of the International Association for Rubber Cultivation in the Netherlands East Indies at Amsterdam, proposed restriction of output with a view to restoring the industry to an economic basis was thoroughly discussed in all its hearings. In the result it was decided by 383 votes to 125 to invite government assistance, and a committee was appointed to open negotiations with the government and to study the best method of applying financial assistance, if granted.

Rubber Growers Divided

It has been well known for some time that the Dutch rubber growers were sharply divided upon the question of restriction of output, and because of this the Dutch Government maintained a neutral attitude, holding that it could give support only to agreements which had the full approval of both sides. In the meantime the economic position of the rubber industry has not improved.

On the contrary, it is more critical than ever, and is causing the larger manufacturers in America, who might be supposed to derive benefit from the present low price of crude rubber, to regard the situation with considerable misgiving.

Fear Demoralized Market

In a letter published during the week, President Carnahan of the International Rubber Co. of the United States writes that American consumers fear that the present advantage to them, as buyers of raw product, will have to be paid for later by a demoralized market and soaring prices. Consequently the larger men, he asserts, are strongly in favor of an effort being made to bring about price stability by restricting production on the lines proposed by the British Colonial Office committee. This outspoken declaration is looked upon as most important in London, because many producers have hitherto hesitated to support restriction on the ground that it might antagonize their best customer—America.

What particular plan will be adopted to ease the situation cannot at present be conjectured. The great and new factor is that the way has been paved to joint action by the British and Dutch governments, neither of which will be short of suggestions and plans put forward to help solve the difficulty.

The latest of these is a proposal by J. N. Burger, managing director of the Serbadjadi Rubber Co. and an opponent of any plan to restrict production. Burger's proposal is that producers and merchants should join to form a pool of 100,000 tons of crude rubber, which would be placed under the administration of the Rubber Growers Association, the rubber trade associations in New York and London, and the International Association of Rubber Cultivators in the Netherlands East Indies at The Hague.

If the market price of crude rubber should rise above 39 cents at the present rate of exchange per half kilo (i.e. 1.1 pounds), the managers would sell, say, 20 per cent of the pool, and so on in proportion. The pool, it is proposed, would be formed by holders delivering to the managers warrants for 35 per cent of their stocks and by producers delivering 35 per cent of unrealized rubber, or of a corresponding quantity out of coming production.

Tire Casing Shipments Show Gain During May

NEW YORK, July 10—Statistics of the rubber industry for the first five months of the year, as compared with the same period in 1921, follow

PNEUMATIC CASINGS

1921—	Inventory	Production	Shipments
Jan.	5,319,605	703,430	965,417
Feb.	5,193,018	819,892	1,073,756
March	4,597,163	1,163,314	1,614,651
April	4,527,445	1,651,418	1,785,951
May	4,451,668	2,100,917	2,085,882
1922—			
Jan.	4,174,000	2,055,000	1,597,000
Feb.	4,691,000	2,084,000	1,562,000
March	5,183,286	2,645,790	2,073,963
April	5,464,336	2,401,187	2,086,651
May	5,523,095	2,721,503	2,639,273

INNER TUBES

1921—	Inventory	Production	Shipments
Jan.	5,586,163	740,824	1,042,617
Feb.	5,415,464	916,627	1,129,881
March	5,044,861	1,346,483	1,643,690
April	4,916,772	1,762,122	1,983,571
May	4,751,880	2,210,040	2,342,567
1922—			
Jan.	5,247,000	2,343,000	1,890,000
Feb.	6,142,000	2,597,000	1,703,000
March	6,591,118	3,017,511	2,090,737
April	7,230,096	2,650,573	2,329,343
May	7,189,552	2,970,696	2,938,947

SOLID TIRES

1921—	Inventory	Production	Shipments
Jan.	303,753	21,220	29,116
Feb.	304,374	23,365	29,599
March	283,800	27,710	43,926
April	269,985	28,859	42,080
May	264,663	35,156	40,122
1922—			
Jan.	182,000	40,000	33,000
Feb.	183,000	39,000	37,000
March	182,197	49,433	48,350
April	173,748	46,664	52,309
May	170,904	57,640	60,711

"Production" and "Shipments" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic work in factory and in transit to, or at warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

Would Unify System of Truck Transport

Consolidation of Private Delivery Service Into One Concern Proposed in Alabama

BIRMINGHAM, ALA., July 10—Motor transportation, conservation of individual operation transportation in Birmingham and nearby sections, spreading out as new roads are built and old ones improved, and providing a delivery system through operation of motor trucks by a single concern, promises to be a studied business in Birmingham.

Discussion of the problems of delivery before a meeting of business men called at the instance of Henry C. Goodman, transfer and warehouse man, brought out much valuable data concerning the possibilities of the proposed plan.

This plan, as proposed by Goodman, would have private trucks taken over by a general motor delivery concern at a fair allowance to the owners in return for service to be rendered. The private concerns would thereafter be relieved of the initial cost of the truck as well as the cost of upkeep.

A single large concern operating a delivery service for a large number of firms would be in position to have repairs made at a minimum cost and secure truck repair parts at minimum prices, he pointed out. He figured that a company operating on a large scale could save those making deliveries in the city and to nearby territory from 30 to 50 per cent of present cost of private truck operation.

Tells of Present Troubles

Sidney J. Bowie, who acted as chairman at the meeting, told of the difficulties of delivery by railroad, the several handlings necessary when shipments are made by rail, and the delays and costs incident to rail delivery. He pictured the progress in motor transportation as good roads are being provided, and declared that the future held great things in this line.

Railroads, he said, were getting most of their returns from long hauls, but had to meet the competition on short hauls. He said that Goodman had invited the assembly to the dinner for the purpose of discussing a system of delivery through established agencies instead of by the individual system.

Goodman, in going into details of the plan, cited instances where the system was being used. Merchants, manufacturers, wholesalers and jobbers were taking advantage of it, he said, because it offered a solution of the delivery problem.

FRANK L. MITCHELL DIES

NEW YORK, July 11—The death is announced at Monticello, Cal., of Frank L. Mitchell, founder and first president of the Mitchell Motor Car Co. He was 70 years old.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

Last week call loans covered a range of 4 per cent to 5 per cent, as compared with 4 per cent to 5½ per cent in the preceding week. There was no essential change in the quotations for fixed date maturities. A range of 4 per cent to 4¼ per cent was covered for 60 and 90 days' and four months' maturities, and 4¼ per cent rules for five and six months, the same as in the preceding week. The prime commercial rate remained unchanged at 4 per cent.

Announcement was made July 7 of a reduction in the rediscount rate of the Federal Reserve Bank of San Francisco from 4½ to 4 per cent, effective July 8. Three institutions, New York, Boston and San Francisco, now maintain a 4 per cent rate.

The forward business on the books of the United States Steel Corp. as of June 30 totaled 5,635,531 tons, which is the largest amount since April of last year, and marks an increase of 381,303 tons over the amount reported on May 31. Inasmuch as shipments of steel during June were on approximately the same basis as in May, this gain in unfilled tonnage appears to be due almost entirely to new bookings. Despite the continued coal strike, the June pig iron production of 2,361,028 gross tons showed continued increase and compares with 2,306,679 tons for May and 1,064,833 for June, 1921.

The Government report as of June 25 estimates the cotton condition at 71.2 per cent of normal, as compared with a 69.6 per cent condition for the previous month, 69.2 per cent for June 25, 1921, and a ten-year average of 76.9 per cent. Based on this condition and the area in cultivation, the Department of Agriculture forecasts a yield of 151.9 pounds per acre, or a total production of 11,000,000 bales, as compared with an actual yield of 7,954,000 bales last year and 13,440,000 bales in 1920.

Although the obstacles to general business recovery have been increased by the railway labor troubles, no serious retardation has yet been noted. The June defaults, 1740 in number, marked the smallest monthly total since last October, and the June liabilities of approximately $38,000,000 are less than any other month since last September. For the second quarter of this year, 5867 defaults with liabilities of $156,000,000 were reported, as compared with 7517 defaults with liabilities of $218,000,000 for the first quarter.

DE BEAR STILL WITH MAXWELL

NEW YORK, July 11—Harry J. DeBear, whose term as president of the Maxwell Distributing Corp., the New York Maxwell-Chalmers branch, terminated with the purchase of the business by the Colt-Stewart Co. is retaining an executive connection with the general Maxwell-Chalmers organization.

The newly organized Colt-Stewart Co. has stepped into the Maxwell-Chalmers business in the New York territory with sales going forward at high speed. June was the largest month in the history of the territory, and July has started off with a large number of orders unfilled on both Chalmers and Maxwell cars.

FINANCIAL NOTES

Hayes Wheel Co. preliminary figures for the six months ended June 30 show net earnings, before taxes but after all expenses and charges including depreciation, in excess of $500,000. The earnings in June were substantially greater than those of the previous months in the present calendar year. Henry A. Rudkin of McClure, Jones & Reed, has been elected a director of the company.

Knox Tire & Rubber Co. property at Mt. Vernon, Ohio, which was bought by a group of stockholders has been fully paid for, the balance of $55,000 due on the purchase having been paid this week by the president of the new company, Judge Frank O. Levering, to Referee in Bankruptcy R. M. Greer. It is planned to place the plant in operation by Sept. 1.

Black & Decker Manufacturing Co. paid a dividend of 2 per cent on the preferred stock for the second quarter and at the same time paid a dividend of 2 per cent for the fourth quarter last year, which is the only dividend that the company had passed. Sales for the first six months of this year are reported to be nearly $1,000,000 gross.

B. F. Goodrich Co. are issuing $20,000,000 worth of the $25,000,000 6½ per cent bonds authorized by the stockholders July 24. The issue is primarily to redeem outstanding 7 per cent notes according to officials of the company and to extend the indebtedness for 25 years instead of the two years which the notes still have to run.

Reo Motor Car Co. announces that the present regular cash dividend of $1 per share on the old stock will also be paid on the new stock recently issued when a stock dividend of 100 per cent was declared.

Hupp Motor Car Corp. has declared a quarterly dividend of 2½ per cent on the common stock, payable Aug. 1 to stockholders of record July 15.

Allis-Chalmers Co. has declared the regular quarterly dividend of 1 per cent on the common stock payable August 15 to stock of record July 24.

Torbenson Axle Co. will redeem on July 15 the scrip issued to holders of the old preferred stock at the time of the recent reorganization.

Kelly-Springfield Tire Co. has declared a quarterly dividend of $2 a share on the 8 per cent preferred stock, payable Aug. 15, to stockholders of record Aug. 1.

PACKARD PROFITS, $317,959

DETROIT, July 13—Sales of the Packard Motor Car Co. for the third quarter of its fiscal year ending May 31, totaled 4305 vehicles and amounted to $11,226,958. Net profits from operations for the quarter were $317,959. Factory inventories were reduced from $9,527,575 to $6,144,289 and inventories at factory branches from $7,250,487 to $5,117,016. The company's holdings of cash and bonds amounted to over $15,800,000, an increase of $5,000,000 in the quarter.

Government Surveys Lighting Equipment

Plate and Tail Illumination Embraced in Work of Bureau of Standards

WASHINGTON, July 11—Because of the need of uniformity in illuminating registration plates on automobiles, the Bureau of Standards is investigating the proper illumination of these plates and the efficiency of the various forms of tail lights. The research by the government experts covers such points as color and position of tail lights on passenger cars and products. The Bureau is also engaged in work covering automobile headlights with the idea of aiding in the unification of state laws governing these appliances.

The bureau is co-operating with the National Safety Council as sponsors for a code of governing colors for street traffic signals.

It is also of interest to the automobile industry to know that the Bureau of Standards has completed its report on the results of tests of tires and tubes submitted by the Sub-Committee on Tires of the Federal Purchase Board. All government departments will base their purchases for the next fiscal year on the recommendations made in this report.

This government bureau has made considerable headway in investigating the reclamation of lubricating oils. Tests completed during the month show that, although an increase in the quantity of oil had been secured by a change in the process, it was done at the sacrifice of the quality. The last oil run out of the purifier contained too much sediment.

Canada Reports Gain in Exports for May

WASHINGTON, July 10—May automobile exports from Canada exceeded by 15.1 per cent those of the preceding month. Of the May exports the United States ranked seventeenth, with Australia, Great Britain, Argentina and South Africa ranking in their respective order.

The United States imports from Canada total seventeen passenger cars valued at $10,937; two trucks, valued at $1,000, and $3,250 worth of parts.

The Canadian May export figures show that a total of 2562 passenger cars were exported, valued at $1,498,276, an increase of 10.4 per cent in number and 10.3 per cent in value over April; 251 trucks, valued at $112,156, an increase of 160 per cent in number and 169 per cent in value; and $117,870 worth of parts exported, an increase of 16.8 per cent over the previous month.

Australia imported by far the largest number of Canadian automotive exports, taking 1001 cars, valued at $464,083; 156 trucks valued at $69,186, and $65,608 worth of parts.

INDUSTRIAL NOTES

Lambert Tire & Rubber Co., Barberton, Ohio, producer of a patented cushion tire has announced that production is being doubled to meet increased demand. The company did not get into production until the middle of last year, although the present company purchased the plant at Barberton three years ago. Much of the increased business has come from foreign fields, according to Guy M. Collette, general manager. Sales in Mexico and England have shown great spurts during the past six months.

Robert H. Hassler, Inc., Indianapolis, manufacturer of shock absorbers, will build a new sales and service station in that city costing $75,000. The company recently exercised its option on the land upon which the building will be erected, having previously leased the property on a 99 year lease. At present there are 250 men employed at the factory. The May and June business of the corporation has kept pace with the large production of cars of the class that use shock absorbers of this type.

Clinton Tire Co., Clinton, Iowa, has secured a site for the erection of an automobile tire building and retreading plant to be in operation Jan. 1, 1923, according to Frank Gottstein of Des Moines. Associated with him in the concern is his son, Joseph. The plant will represent an investment of between $500,000 and $750,000 and will employ a force of from 150 to 200 workers. It will have a capacity of making and retreading 500 tires.

Firestone Steel Products Co. which manufactures rims and truck tire bases for the Firestone Tire & Rubber Co., has occupied a new single story brick and steel building in Akron more than 1/6 of a mile long and 250 feet wide. This, with a two story office building, gives the plant about five acres of floor space. The production capacity will be 20,000 rims and 4,000 solid truck tire bases daily.

Hendee Manufacturing Co. reports that its production in May approximated 1,100 motor cycles and side cars, the gross sales, including parts, amounting to $450,000. May was the best month the company enjoyed since the middle of 1921. Foreign business is reported as steadily increasing, the company having spent considerable money advertising in Great Britain.

Kansas City Tire & Rubber Corp., reorganized by the purchasers as the Rubber Manufacturing Corp., is again manufacturing tires and tubes. Approximately 200 persons are employed at the plant which consists of three buildings. Production averages 650 tires a day. P. E. Werner, an official of the company, is president.

Spicer Manufacturing Co. has put on two shifts at the Pottstown, Pa., plant. Three hundred men are employed and the number is being increased, while 1,400 are at work at the Plainfield factory. The July output will be 30,000 joints and the August production will be the same. In September the schedule calls for 60,000 joints.

General Top Co., the **Allwether Top and Body Co.** and the **Artcraft Top Co.** have been merged under the name of the **Artcraft Top Co.**, with offices and factory in Cleveland. Joseph Hayes has been elected president and general manager.

Nebraska Tire & Rubber Co. has increased its production of tires 500 per cent since 1920. The company reports that it is now producing tires at the rate of 1,000 daily, working three eight-hour shifts and employing about 225 men.

Monkey Grip Tire Patch Co., which has purchased the plant of the Texas Motor Car Association in Fort Worth is preparing to move from Oklahoma City. It is expected that the Fort Worth plant will be opened Sept. 1.

Hood Rubber Co. reports sales for the first five months of 1922 were $1,200,000 in excess of last year.

EMPLOYMENT 389 GREATER

DETROIT, July 10—Addition of 389 workers to the pay rolls of members of the Employers Association was reported last week. The total now is 181,360 as compared with 110,000 for the same week last year and 189,000 for the corresponding week of 1920.

Studebaker to Erect New Service Stations

CLEVELAND, July 10—The Studebaker Corp. of America will begin work at once on a new service station on East 25th Street near Payne Avenue, in this city, which will cost about $250,000. The building will be ready for occupancy about Oct. 1. The structure will be a model building of its type with 85,000 sq. ft. of floor space. It will be equipped with the most modern machinery and time-saving devices.

The floors will be connected with ramps in the center of the building, and all doors will be operated electrically. There will be a large reception room on the ground floor for the convenience of owners while waiting for minor repairs or adjustments. A separate department will be operated to prepare new cars for delivery to owners.

Building in Brooklyn

BROOKLYN, N. Y., July 11—Work has been started by the Studebaker Corp. of America on a new service station on property recently purchased at Bergen and Dean Streets. The cost of land and building will approximate $500,000. The building will be a model in all respects and will be ready for occupancy about Oct. 1.

Gasoline Consumption Broke Records in May

WASHINGTON, July 12 — Reflecting the tremendous increase in the use of motor vehicles during the late spring and early summer months, refinery statistics for May, as compiled by the Bureau of Mines, show that domestic consumption of gasoline is breaking all records. The May consumption figures are within 4,000,000 gallons of the August peak figures. It is expected that the June consumption figures will exceed the high mark of August of last year. Total gasoline consumption for May amounted to 499,242,343 gallons against a production of 513,658,966.

METAL MARKETS

Factors that make for an upward tendency in the steel market appear to be nicely balanced by those working in buyers' favor. Hence there is very little incentive to incisive changes in values in the immediate future. The effect of the coal strike is beginning to be felt more keenly by some of the smaller independents. Scarcity of efficient mill labor is more pronounced. There is talk of an increase in wage scales. Most of the mills catering to automotive consumers have a sufficient backlog of orders to carry them through to the end of August.

All of these influences furnish support to the strengthening of market conditions. They are offset, however, by a recession in fresh buying for deferred delivery and the general uncertainty that obscures the outlook. Seasonal easing off in demand as the year's last quarter approaches is a condition which even dyed-in-the-wool optimists can not overlook. All in all, it looks, therefore, as though, barring unforeseen developments, prevailing market levels would continue in effect over the remainder of the summer. It is fairly possible, however, that amid the dislocation of transportation conditions another premium market for spot deliveries will ensue and exert a certain influence on the major market. Steel producers fear that, what with the upset condition of the coal movement, the beginning of the grain shipping season will make so heavy demands on the supply of rolling stock that they will experience the greatest difficulties in keeping themselves supplied with raw materials and that the shipment of finished products will tax the resources of their traffic departments to the utmost.

The reduction in freight rates which went into effect at the beginning of this month has had no effect on the market. In the pig iron market rising prices have more than offset the saving to blast furnaces accruing from the diminished expense for the haulage of their raw materials. Steel warehouse men, especially those in the Detroit district, continue to enjoy almost unprecedented prosperity as the result of their foresight in stocking material which automotive consumers are urgently in need of, and which mills are unable to deliver within the brief space of time in which consumers want it.

Pig Iron.—Small lot buying by automotive foundries appears to be the rule. Prompt shipments of foundry iron in the Chicago market are held at $25.

Steel.—Although the $33 sheet bar price of the chief interest is largely nominal as it is extended to regular customers only, it serves to keep the general market at $35 when a few weeks ago this price level threatened to give way to a higher figure. Makers of cold-drawn steel bars are now working on merchant steel bars that cost them from 1.60 to 1.70¢, so that they are quoting 2.10¢ as a minimum for their product. So far the price for cold-rolled strips has not been affected by the $2 per ton advance in hot-rolled, the quotation for the former remaining at 4¢. Conditions in the sheet market are unchanged. Isolated sales of full-finished sheets at a premium of $7 over the chief interest's price are heard of. Further advances in bolts and nuts are predicted.

Aluminum. — The market has turned dull with prices unaltered.

Copper.—Labor shortage tends to keep fresh output down. Consuming demand, however, is light.

Calendar

SHOWS

Aug. 4-13—Chicago, Aircraft Exhibition and Aeronautical Congress.

Aug. 26-Sept. 1—Toronto, Ont., National Automobile Show held in conjunction with the Canadian National Exhibition.

Sept. 4-9—Indianapolis, Automobile and Accessory Show in conjunction with the Indiana State Fair, Auto Show Building, under the auspices of the Indianapolis Automobile Trade Association, J. B. Orman, manager.

Sept. 23-30—New York, Closed Car Show, Grand Central Palace.

Oct. 21-28—Washington, D. C., Annual Closed Car Salon, Convention Hall, under the auspices of the Washington Automotive Trade Association.

Nov. 13-18 — Chicago, Annual Show and Meeting of the Automotive Equipment Association.

Dec. 3-9—New York, Eighteenth Annual Automobile Salon, Commodore Hotel.

January—Chicago, Annual Automobile Salon.

Jan. 6-13—New York, National Automobile Show, under auspices of National Automobile Chamber of Commerce.

FOREIGN SHOWS

March 10-July 31—Tokio, Japan, Peace Exhibition.

July 1-24—London (Olympia), Aircraft Exhibition.

Sept. 1922 — Rio de Janeiro, Brazil, Automobile Exhibits in Connection with the Brazilian Centenary Associação Automobilista Brazileria.

Sept. 15-20—The Hague, Automobile Show.

Sept. 25-Oct. 3—Berlin, Automobile Show at the Kaiser-Damm Hall under the auspices of the German Automobile Manufacturers Association.

September — Buenos Aires, Argentina, Annual Exhibition, Sociedad Rural Argentina.

Oct. 4-15 — Paris, Automobile Show, Grand Palais.

Nov. 3-11 — London (Olympia), Automobile Show.

Nov. 10 - Dec. 19 — Brussels, Automobile Show, Palais de la Cinquantenaire.

Nov. 29-Dec. 4—London (Olympia), Cycle and Motorcycle Show. British Cycle Motors, The Tower, Warwick Road, Coventry.

November—Buenos Aires, Argentina, Annual Exhibition, Automovil Club Argentino.

CONVENTIONS

July 17 — Baltimore, meeting, representatives of highway departments of ten Eastern states.

August 28-Sept. 2 — Detroit National Safety Congress.

Sept. 18-23, 1922 — Rome, Italy, Second Annual Meeting of the International Chamber of Commerce.

Sept. 13, 14, 15—Buffalo, Lafayette Hotel, Annual credit meeting, Motor and Accessory Manufacturers Ass'n.

Chicago Experiences Slowing Up of Sales

No Indication of Slump, However —Dealers Dispose of Used Car Stocks

CHICAGO, July 10—Although the first few days of July showed a slight slowing up of retail automobile sales in Chicago, there is no indication of a slump. Some dealers have not yet caught up with deliveries which they were unable to make last month. Others have availed themselves of the good selling season to dispose of stocks of used cars, some having sold all used cars in stock and advertised in the newspapers for more.

An analysis of sales made in Chicago and Cook county on the time payment plan, constituting probably 65 to 70 per cent of the total sales, indicates that the high point of the season was reached here in the week ending May 27, when 1261 time payment sales were recorded. The next highest week was that ending June 10, when 1248 such sales were recorded. The record since that time has been: Week ending June 17, 1197; June 24, 908; July 1, 927.

More Time Sales Reported

In the four weeks ending July 1 a total of 4280 time sales was recorded, compared with a total of 4275 in the four weeks ending June 3. This indicates that May and June were practically equal as sales months, with June having a slight lead. There is no expectation among dealers that July will reach the May and June level, but on the other hand the opinion is general that the decline will be slight.

The dealers affiliated with the Chicago Automobile Trade Association are preparing for an elaborate showing of cars at the annual Chicago Pageant of Progress on the Municipal Pier July 29 to Aug. 14. They have taken a display section more than twice the size of that taken by any other industry and are counting upon this show to give a decided stimulus to late summer and early fall buying. It is believed that nearly every resident of Chicago and thousands from surrounding territory will attend this exposition, and the dealers figure that it is the best opportunity of the year to have their goods seen by the maximum number of prospective customers.

New York Sales' Decline Merely Seasonal Feature

NEW YORK, July 13—A canvass of passenger car sales agencies in the metropolitan district indicates that the falling off in business since July 1 is nothing more than a normal seasonal decline. A number of the popular makes are still going strong, with dealers remaining behind on deliveries, and reasonably frequent sales are being made by representatives of lines less in demand.

Registration officials report listings of new cars for the first half of the month only slightly less active than in June. Many of these registrations are of delayed deliveries on June orders. The June registrations for the metropolitan area have not yet been compiled, but a survey of the work indicates that the total will equal and is likely to exceed May, which was the heaviest month in several years.

German Reports Show Decline in Exports

WASHINGTON, July 12—The March exports of automotive products from Germany totaled 972 cars, being an increase of 288 over the automotive exports for February, which numbered 684. The April exports totaled 493 passenger cars and 271 trucks, representing a slight decrease over the previous month.

The Automotive Division of the Department of Commerce has been advised that, according to German official statistics for the first quarter of 1922, 226 passenger cars were imported, two of which came from the United States.

Men Employed Show Plants at Top Speed

Shortage of Skilled Labor Continues to Be Problem at All Plants

WASHINGTON, July 10 — Figures compiled by the Department of Labor in an industrial employment survey under the auspices of the United States Employment Service shows that the automobile industry is running at top speed. Overtime is the rule in most plants in the Detroit area and similar conditions are reported in other automobile manufacturing centers. Practically all automobile manufacturers report a shortage of skilled workers.

Statistics of employment for June show an increase of 6.5 per cent in the automobile industry over the preceding month.

Agents of the employment service at Detroit declare that the factories are bidding for skilled and unskilled labor. A call for 400 jobs sent out in one day received no applicants. About 3000 men have been added to payrolls every week for the past five months.

In Flint, Mich., there was a shortage of workers, particularly tool makers, body builders, sheet metal workers and body finishers.

In Lansing and Muskegon, Mich., all plants are working full time with a shortage of skilled laborers. There is also a shortage of skilled workers in the automobile industry in Wisconsin and Ohio. In Dayton automotive and pump companies report inadequate supply of laborers.

BIG JORDAN QUARTER

CLEVELAND, July 13—Notwithstanding price reductions, the volume of business done by the Jordan Motor Car Co. in the second quarter of 1922 exceeded the volume in the same period last year of 41 per cent. Production was 69 per cent larger than in the second quarter of 1921.